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G. ENERGY RESOURCES AND UTILITIES

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SETTING

Energy Resources and Facilities

Conventional Resources

Pacific Gas and Electric Company (PG&E) supplies all of San Francisco's electricity and natural gas. PG&E also operates a district heating system in the downtown area. A second, smaller steam-heating system owned by the City serves municipal buildings in the Civic Center.

Electricity. San Francisco obtains its electricity from two local gas-fired power plants, Hunters Point and Potrero, with a total capacity of about 792 megawatts (MW)./1/ Interties with other portions of the PG&E service area and other utilities in the state enable the city to receive power from plants outside San Francisco. The Embarcadero, Larkin, and Mission substations distribute electricity within the C-3 District./2/

PG&E's total electrical capacity is about 19,700 MW and consists of about 39% oil- or gas-fired plants; about 26% hydroelectric; about 16% nuclear; about seven percent geothermal; about six percent pumped storage; about two percent cogeneration; and about five percent purchases from other utilities./3/ The Diablo Canyon nuclear power plant, scheduled to begin supplying commercial power in May, 1984, will provide about 15% of total capacity and other nuclear sources will provide about 1%./4/ The Helms Pumped Storage Hydroelectric Project, which began operation in December, 1983, provides the entire pumped-storage component./5/ PG&E purchases some electricity from other utilities, mostly inexpensive surplus hydroelectric power from Washington and Oregon. PG&E will continue purchasing surplus hydroelectric power as long as it is available and inexpensive./6/

Natural Gas. PG&E distributes natural gas to San Francisco from four gas storage tanks located in the city. Natural gas delivered to the city comes from gas fields as distant as Texas and Alberta, Canada. PG&E purchases, rather than produces, most of its natural gas; its policy is to purchase first from non-California sources./2/ This policy, which helps preserve California's natural gas in case of shortages, will continue as long as it is economical. PG&E receives about 46% of its natural gas from Canada, about 37% from the southwestern United States, and about 17% from California. Imports were about one billion cu. ft. per day in 1982./7/

Steam. PG&E's only steam district heating system, consisting of natural gas-fired boilers and steam distribution lines, serves portions of the C-3 District./2/ Station S, built in 1913, has boilers with a combined capacity of 130,000 lb steam/hour and 2.8 miles of low-pressure distribution lines. Station T, built in 1924, has a capacity of 360,000 lb steam/hour and 9.9 miles of distribution lines./2/

Liquid Fuels. Private vehicles and public transit serving the C-3 District, such as buses and Caltrains, purchase gasoline and diesel fuel from a variety of distributors in the San Francisco area.

Alternative Energy Resources

The potential exists in the project area for developing alternative, or unconventional, power sources such as cogeneration or solar systems./5/ Cogeneration in the C-3 District is being investigated jointly by the City and PG&E./8/ Passive solar design and daylighting could reduce energy use in appropriately designed highrises./5/

Energy Conservation

The existing energy conservation potential in the downtown area is a resource that will be affected by future development. For example, the potential for recycling wastes is substantial and an increase in density of development will enhance the economic feasibility of recycling programs. As another example, existing buildings represent large amounts of energy embodied in building materials and in construction; retaining them would decrease new commitments of energy. However, energy would be used more efficiently in the operation of new structures.

Energy Demand and Consumption

Electricity

Electricity use in the C-3 District will be about 2.3 billion kilowatt-hours (kWh), or 23 trillion British thermal units (Btu) per year in 1984./9,10/ Most of this electricity will be used for lighting, air conditioning, and computer use, primarily in the commercial sector./2/ Based on California Energy Commission (CEC) projections of average electricity prices, electricity used in the C-3 District in 1984 will cost about $180 million./11/

Electricity demand in the C-3 District during 1984 is expected to peak at about 560 MW on warm weekday afternoons in August or September. Peak demand during the summer air conditioning season has been increasing at about twice the rate as peak demand during the winter heating season, which is about 530 MW. Growth in annual peak demand at the Embarcadero substation has been about 16%/year, while that at the Larkin and Mission substations has been about two percent and 0.6%, respectively./2/

San Francisco's electricity use has been increasing at about one percent per year and now accounts for about two percent of the state's electricity use. Electricity consumption in the city will be about 3.8 billion kWh in 1984./12/ The residential sector accounts for about 26% of electricity use in the city; the commercial sector about 53%; the government sector about 12%; and the industrial sector about 7%./2/ Electricity provides about 52% of the energy used in the city.

Peak demand for electricity in the city is about 775 MW./12/ City-wide demand has historically peaked in winter, whereas system-wide demand usually peaks in summer./13/ In the 1970s, however, summer demand increased more rapidly than winter demand. This was probably due to the large amount of commercial development, combined with conversion of residential space heating from electrical to natural gas./2/ City-wide demand in 1984 will probably peak in August or September.

Electricity provides about 57% of the energy used in the PG&E service area. Consumption increased at about 3.4%/year between 1974 and 1979, and will be about 78 billion kWh in 1984./2,14/ The residential sector accounts for about 33% of electricity use in the service area; the commercial sector 30%; and the industrial sector 26%./2/ Peak demand, which determines PG&E's generation and distribution capacity, will be about 16,000 MW in 1984; PG&E's reserve margin will be about 23% of peak demand./3,5/

Natural Gas

Natural gas use in the C-3 District is about 5.1 billion cu. ft., or about 5.6 trillion Btu, per year./10/ Demand typically peaks on January mornings as natural gas-fired boilers begin heating buildings. The amount of the peak in the C-3 District is unknown, but the ratio of peak to average demand is probably larger than for the city as a whole. Based on projections of average natural gas prices, natural gas used in the C-3 District in 1984 will cost about $33 million./15/

About 35 billion cu. ft. of natural gas is consumed in the city annually. The residential sector accounts for about 63% of natural gas use in the city; the commercial sector 27%; and the industrial sector 6%./2/ Peak demand in the city is about 280 million cu. ft. per day, about seven percent of service area demand./13/ Natural gas is used primarily for space and water heating, although the amount used for air conditioning is increasing./2/ Consumption in the PG&E service area is about 600 billion cu. ft./16/ Peak demand in the service area, which normally occurs in January, is about 3.7 billion cu. ft. per day./13/

Steam

PG&E's steam district heating system will supply about one billion Btu of heat to about 230 commercial customers in 1984./17/ Since 1969, more than 138 customers have discontinued steam purchases from PG&E due to price increases, business terminations, building demolitions, or changes in steam-using equipment./2/ Fuel cost and distribution losses are significant problems for the steam heating districts./18/ If the system is retrofitted for cogeneration, however, steam prices may go down. Future demand, which will depend on prices, is difficult to estimate due to these uncertainties.

Transportation Energy

In 1984, automobiles will provide about 1.2 billion passenger-miles per year of travel between the Downtown and outlying areas, while requiring about 41 million gallons of gasoline. BART and electric Muni trolleys will provide about 990 passenger-miles of travel between the downtown and outlying areas using about 220 million kWh. Caltrain and bus transportation within the region will provide about 840 million passenger-miles of travel between the downtown and outlying areas while using about 6.8 million gallons of diesel fuel. The overall source energy requirement of about 9.1 trillion Btu annually to provide about 3.1 billion passenger-miles of travel is about 2,900 Btu per passenger-mile./9/ Transportation energy costs to consumers for travel in and out of the Downtown will be about $76 million./19/

Energy Conservation Policies, Regulations, and Ordinances

Rising energy costs and energy shortages have led to general concern for energy conservation. At the state level, Title 24 of the California Administrative Code regulates the energy efficiency of buildings./20/ At the local level, elements of the Comprehensive Plan, the City Administrative Code, and related policies establish energy conservation measures.

Local Energy Conservation Measures

The Energy Component of the Environmental Protection Element of the Comprehensive Plan is the basis for local energy management, providing a general policy framework to direct both public and private decisions on energy use./8,21/ Specific energy conservation measures for the city were developed by the Citizen's Energy Policy Action Committee (CEPAC), appointed by the Mayor in 1981 to study energy problems and to recommend energy conservation measures. CEPAC's final report was adopted as the local energy conservation action program./22/ An energy management committee, composed of representatives from the public and private sectors was established to carry out the recommendations of CEPAC for the commercial sector./7/ A district heating committee has been established to provide recommendations on both PG&E and municipal heating systems.

State Energy Conservation Regulations

New buildings in San Francisco must comply with Title 24 through either its prescriptive or its performance standards. Prescriptive standards ensure energy efficiency through required building design features. Performance standards are allowable annual energy budgets which, if met, exempt a building from some prescriptive requirements. The State Title 24 regulations are enforced in San Francisco by the Bureau of Building Inspection through the building permit review process.

IMPACTS

C-3 District Energy Requirements

Energy Requirements for Building Construction

Building construction requires energy primarily for fabrication and transportation of construction materials, worker transportation and labor, and operation of power equipment. New construction also requires some energy for demolition, excavation, grading, and hauling of demolition debris from construction sites.

1990 Impacts. Development occurring in the downtown between 1984 and 1990 would require more than 18 trillion Btu, the energy equivalent of about three million barrels of oil./23/

2000 Impacts. New construction in the downtown between 1984 and 2000 would require more than 33 trillion Btu, equal to about six million barrels of oil. About 55% of this construction would occur in the six years between 1984 and 1990, whereas only about 45% would take place between 1990 and 2000 under the Downtown Plan.

Energy Requirements for Building Operation

New development would increase electricity use and peak summer electricity demand in the downtown. Most of this electricity would be used for lighting, air conditioning, and computer operations. Tall buildings would have higher-than-average electricity budgets due to the extra energy required for elevators, pumps, and blowers to transport people and materials to upper floors. Because tall buildings must devote a greater portion of their gross floor area to elevator cores, ducts, stairs, and other non-leasable space than low-rise buildings, their effective energy budgets are even greater if based on leasable, rather than gross, floor space./24/

New development would also increase natural gas consumption in the downtown, primarily for space and water heating. Demand would continue to peak on winter mornings due to start-up heating of large commercial structures. Tall buildings would have above-average space heating requirements, on a sq. ft. basis, because of heat loss due to higher wind loads on the upper stories./25/ All-electric buildings would have above-average energy budgets since electric-resistance heating is less efficient than natural gas heating.

New development, however, would account for only a small part (see 1990 and 2000 Impacts below) of future energy requirements in the C-3 District. Most of the future energy demand in the C-3 District is expected to be created by existing older, relatively energy-inefficient structures. As these are replaced with new, more efficent structures built according to California Title 24 Energy Standards, the average energy budget of downtown development would decrease.

The thermal energy of the electricity and natural gas used in the downtown becomes waste heat, which contributes to the urban "heat island" effect./26/ The increased building mass of new development would also contribute to this effect by increasing the total thermal mass of the downtown and by increasing shielding of the district from ventilation by the wind.

1990 Impacts. New development between 1984 and 1990 would increase consumption of electricity in the downtown by about 210 million kWh per year, about a nine percent increase from the approximately 2.3 billion kWh per year required in 1984./10/ Increased electricity consumption in the downtown would also increase peak electricity demand by about 55 MW, bringing total demand there to about 615 MW./27/ Natural gas consumption in the downtown between 1984 and 1990 would increase by about 300 million cu. ft. per year, about a six percent increase from that in 1984./10/ The natural gas and electricity required for new development in 1990 would be about 2.4 trillion Btu per year (equivalent to about 430,000 barrels of oil per year), yielding an average energy budget for the approximately 12.1 million sq. ft. of new development of about 200,000 Btu per sq. ft. per year.

About 2.5 billion kWh per year of electricity and about 5.4 billion cu. ft. per year of natural gas would be required in the downtown in 1990./10/ This energy is equivalent to about 31 trillion Btu per year (equivalent to about 5.3 million barrels of oil), compared to about 29 trillion Btu per year in 1984. About 14 trillion Btu per year of this thermal energy will become waste heat locally./25/ In 1990, the average energy requirement of all buildings in the downtown would be about 280,000 Btu/sq. ft.-year, compared to about 300,000 Btu per sq. ft. in 1984 (see Table IV.G.1).

2000 Impacts. New development between 1984 and 2000 would increase annual consumption of electricity in the downtown by about 330 to 350 million kWh per year, about 14% to 15% more than the approximately 2.3 billion kWh per year required in 1984./9,26/ About 40% of this growth would occur between 1990 and 2000. Development between 1990 and 2000 would increase peak electricity demand in the C-3 District by about 50 MW from the 1990 level of 615 MW, bringing total demand in 2000 to about 665 MW./27/ Natural gas consumption in the C-3 District in 2000 would be about 5.6 billion cu. ft. per year, about 10% more than that required in 1984 and about four percent more than in 1990 (see Table IV.G.1). The natural gas and electricity required for new development between 1984 and 2000 would be about 4.2 trillion Btu per year (equivalent to about 720,000 barrels of oil per year), yielding an average energy budget of about 190,000 Btu per-sq.-ft. per year. The 1990-2000 increment of new development, for

TABLE IV.G.1: BUILDING ENERGY CONSUMPTION IN THE C-3 DISTRICT, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN (a)

				DOWNTOWN PLAN		
Parameter	1984	1990	% Change 1984-1990	2000	% Change 1984-2000	% Change 1990-2000
Electricity (billion kWh per year)	2.3	2.5	9	2.6	15	6
Peak Electric Demand (megawatts)	560	615	10	665	19	8
Natural Gas (billion cu. ft. per year)	5.1	5.4	6	5.6	10	4
Total Energy (trillion Btu per year)	29	31	7	33	14	6
Average Energy Budget (thousand Btu/sq. ft.)	300	280	-7	280	-7	0

(a) The methods by which estimates of electricity and natural gas consumption were derived are explained in Appendix N.

SOURCE: Environmental Science Associates, Inc.

comparison, would have an average energy budget of about 180,000 Btu/sq. ft.-year, based on an annual energy requirement of about 1.8 trillion Btu and total floor area of about 9.8 million sq. ft.

Under the Downtown Plan, the total energy required in the downtown in 2000 would be 2.6 billion kWh per year of electricity and 5.6 billion cu. ft. per year of natural gas./28,10/ This energy is equivalent to about 33 trillion Btu per year, or about 5.7 million barrels of oil per year, of which about 15 trillion Btu per year would become waste heat locally./29/ In 2000, under the Plan, the average energy requirement of buildings in the downtown would be about 280,000 Btu per sq. ft. per year, compared to about 300,000 Btu per sq. ft. per year in 1984 and 280,000 Btu per sq. ft. in 1990.

Energy Requirements for Transportation

The transportation sector consumes electricity, gasoline, and diesel fuel in providing transportation for worker and non-worker trips between the downtown and outlying areas. The total energy requirement for this travel depends upon the total passenger-miles provided by each mode of travel and the energy efficiency of each mode of travel. Generally, buses, trains, and other mass transit are more energy-efficient per passenger-mile than private automobiles. Thus, a shift of trips from automobiles to public transit would increase average transportation energy efficiency.

1990 Impacts. Between 1984 and 1990, total vehicle-miles-traveled (vmt) generated by C-3 District development would increase about 15%, from about 860 million to about 990 million miles per year./10/ Average fuel efficiency is projected to increase about 25% between 1984 and 1990, from about 21 to about 26 miles per gallon (mpg)./30/ Gasoline consumption for downtown-related travel would decline by about 10%, from about 41 million to about 38 million gallons per year. Travel via BART and Muni electric trolleys between the downtown and outlying areas would increase by about 30%, from about 990 million to about 1.3 billion passenger-miles per year./10/ Total travel provided by bus routes within the region would increase by about five percent, from about 770 million to about 810 million passenger-miles per year.

These changes in the number and mode of trips would change total energy required by only about one percent (see Table IV.G.2) even though total passenger-miles would increase by about 16%. Energy efficiency in the transportation sector would increase by about 10%, from about 2,900 Btu (equivalent to about 0.021 gallons of gasoline) to about 2,600 Btu (equivalent to about 0.019 gallons of gasoline) per passenger-mile./10/

2000 Impacts. Between 1984 and 2000 under the Downtown Plan, automobile vmt would increase about 28%, from about 860 million to about 1.1 billion miles per year. About 46% of this increase, about 110 million miles per year, would occur between 1990 and 2000. Average fuel efficiency is expected to increase by about five percent between 1990 and 2000, from about 26 mpg to about 28 mpg, for a total 1984-2000 increase in fuel efficiency of 32%, from about 21 to about 28 mpg./30/ Between 1990 and 2000, gasoline consumption for automobile travel related to downtown development would increase from about 38 million to about 40 million gallons per year for a total 1984-2000 decrease of

TABLE IV.G.2: TRANSPORTATION ENERGY CONSUMPTION RELATED TO C-3 DISTRICT DEVELOPMENT, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN (a)

				DOWNTOWN PLAN		
Parameter	1984	1990	% Change 1984-1990	2000	% Change 1984-2000	% Change 1990-2000
Electricity (million kWh per year)	220	270	23	320	45	19
Gasoline (million gallons per year)	41	38	-7	40	-2	5
Diesel Fuel (million gallons per year)	6.8	7.2	6	8.3	22	15
Total Energy (trillion Btu per year)	9.1	9.2	1	10.1	11	10
Average Energy Budget (Btu per passenger-mile)	2,900	2,600	-10	2,500	-14	-4

(a) The methods by which these estimates were derived are explained in Appendix N.

SOURCE: Environmental Science Associates, Inc.

about two percent, from 41 million to 40 million gallons per year. Downtown-related travel via BART and Muni electric trolleys would increase between 1984 and 2000 by about 40%, from about 990 million to about 1.4 billion passenger-miles per year./10/ About 40% of this increase, about 170 million passenger-miles per year, would occur between 1990 and 2000. Travel via regional bus systems would increase about 16% from about 810 million to about 940 million passenger-miles per year between 1990 and 2000, for a total 1984-2000 increase of about 22%.

Changes in numbers and modes of trips related to downtown development between 1990 and 2000 under the Downtown Plan would increase total transportation sector energy requirements by about 11% over 1984 levels and about 10% over 1990 levels, from about 9.1 trillion to about 10.1 trillion Btu per year (equivalent to about 1.7 million barrels of oil). Total travel would increase from about 3.6 billion passenger-miles in 1990 to about 4.1 billion passenger-miles per year in 2000./10/ Energy efficiency in the transportation sector would increase about four percent from 1990, for an overall 1984-2000 increase in efficiency of about 14%, to about 2,500 Btu per passenger-mile./10/

Operational Energy Costs

The dollar cost of energy required for building operations and transportation is probably the most visible and immediate impact of energy consumption to residents and firms in the downtown.

1990 Impacts. Building energy costs to customers in the downtown in 1990, in constant 1983 dollars, would consist of about $210 million per year for electricity and about $54 million per year for natural gas. The total building energy costs of about $260 million per year would be about 24% higher than costs in 1984. Transportation energy would cost about $79 million per year, about four percent more than in 1984. Total energy costs to downtown development in 1990 will be about $340 million per year, about 17% more than in 1984./10,15/

2000 Impacts. Building energy costs in the downtown in 2000 would consist of, in constant 1983 dollars, about $260 million per year for electricity and about $80 million per year for natural gas. The total building energy costs of about $340 million per year would be about 62% higher than costs in 1984, and about 31% higher than costs in 1990. Transportation energy would cost about $91 million per year in 2000, about 20% more than in 1984 and above 15% higher than in 1990. Total energy costs to downtown development in 2000 would be about $430 million per year, about 26% more than in 1990 and about 48% more than in 1984./11,15/

San Francisco Energy Requirements

Development in the downtown would contribute to increased city-wide energy requirements.

1990 Impacts. San Francisco's electricity requirements would be about 4.2 billion kWh per year by 1990, an 11% increase from 1984./10/ The percentage of the city-wide peak demand created by downtown commercial development would be about 80% of total demand in 1990./31/ Peak demand in the city would be about 884 MW, a 14% increase in six years./12/ Demand in 1990 would exceed the local capacity of 792 MW provided by the Hunters Point and Potrero power plants. About 35 billion cu. ft. of natural gas would be consumed in the city annually in 1990./10/

TABLE IV.G.3: C-3 DISTRICT ENERGY IN RELATION TO CITY AND REGIONAL REQUIREMENTS (a)

	C-3 DISTRICT		SAN FRANCISCO		REGION (b)	
Year	Electricity(c)	Natural Gas(d)	Electricity(c)	Natural Gas(d)	Electricity(c)	Natural Gas(d)
1984	2.3	5.1	3.8	35	78	600
1990	2.5	5.4	4.2	35	89	600
2000	2.6	5.6	5.0	35	113	600

(a) The bases for the estimates of building energy consumption shown in this table are described in detail in Appendix N.
(b) Pacific Gas & Electric Company service area.
(c) Electricity values are in billion kWh per year.
(d) Natural gas values are in billion cu. ft. per year.

SOURCE: Environmental Science Associates, Inc.

2000 Impacts. San Francisco's electricity requirements would be about 5.0 billion kWh per year by 2000, about a 32% increase from 1984. Peak demand for the city would be about 1,000 MW, a 30% increase in 16 years. Demand in 2000 would exceed the local capacity of 792 MW provided by the Hunters Point and Potrero power plants. About 35 billion cu. ft. of natural gas would be consumed in the city annually by 2000./10/

Regional Energy Requirements/32/

Development in the downtown, along with other development in San Francisco, would contribute to increased demand for electricity and natural gas within the PG&E service area.

1990 Impacts. San Francisco would account for about five percent of the 88.5 billion kWh per year of electricity to be consumed in the PG&E service area in 1990. PG&E's estimated 1990 requirements represent a 13% increase from 1984./14/ PG&E plans to supply about 20% of this increased electrical usage in 1990 from nuclear sources; about 22% from oil and gas facilities; about 28% from hydroelectric facilities; about 16% from geothermal facilities; about ten percent from cogeneration; about one percent from wind, and about two percent from imports./14/ The total amount of electricity from nuclear power plants is not expected to change between 1984 and 1990. The amount from cogeneration is projected to increase about 260%; the amount from geothermal power is projected to increase about 50%; and the amount from hydroelectric is projected to increase about seven percent. Between 1984-1990, the amount from oil and gas-fired plants is expected to decline about three percent, and purchases from other utilities are expected to decline about 47%. This expected shift in resources over the six-year period is consistent with long-term trends toward less reliance on oil and natural gas-fired power in favor of cogeneration and hydroelectric and geothermal power.

PG&E expects its peak system-wide electrical demand to increase by about 15% between 1984 and 1990 to about 18,300 MW./3/ To meet new demand, PG&E plans to increase system capacity by about 10% and allow its reserve margin to decline from about 23% to about 18%. PG&E expects its electrical capacity in 1990 to be about 21,700 MW, consisting of about 34% oil- or gas-fired plants; about 32% hydroelectric; about 14% nuclear; about ten percent geothermal; about six percent cogeneration; and about five percent purchases from other utilities./3/

Natural gas consumption in the PG&E service area, about 600 billion cu. ft. per year, is not expected to change substantially between 1984 and 1990./7/ PG&E plans to continue receiving most of its natural gas from Canada and from Texas under long-term contracts./7/

2000 Impacts. Under the Downtown Plan, San Francisco would account for about four percent of PG&E's system-wide energy consumption in 2000. PG&E expects that about 113 billion kWh of electricity will be consumed in their service area in 2000, a 28% increase from 1984./14/ About 16% of this increase is expected by PG&E to be from nuclear sources; 18% from oil and gas facilities; about 22% from hydroelectric facilities; about 13% from geothermal facilities; about 17% from "other" (undefined) sources; about ten percent from cogeneration; about four percent from imports; and about one percent from wind./14/ The total amount of energy from nuclear power plants is not expected by PG&E to change between 1984 and 2000. The amount from cogeneration is expected to increase about 320%, and the amount from hydroelectric sources about nine percent. Energy from oil and gas-fired plants is expected to decline about two percent during the same period, and purchases from other utilities are expected to increase by about 25%.

PG&E expects peak system-wide electrical demand to increase 45% between 1984 and 2000 to about 23,000 MW./3/ To meet new demand, PG&E plans to increase system capacity by about 35% while allowing its reserve margin to decline from about 23% to about 15%. PG&E's electrical capacity in 2000 is planned to be about 27,000 MW consisting of about 17% oil- or gas-fired plants; about 27% "other" (undefined) sources; about 26% hydroelectric; about 12% nuclear; about nine percent geothermal; about five percent cogeneration; and about four percent purchases from other utilities./3/

Natural gas consumption in the PG&E service area, at about 600 billion cu. ft. per year, is not expected to change substantially between 1984 and 2000./7/ PG&E plans to continue receiving most of its natural gas from Canada and from Texas under long-term contracts./7/

Relationship of the Downtown Plan with Energy Policies of the Master Plan

The Energy Policy component contains policies to address energy-related issues in the municipal, residential, commercial, and transportation sectors./21/ Some of these policies address municipal activities or intergovernmental relations. Other policies address practical obstacles to conserving energy, such as financing, incompatible building code requirements, or lack of information. Still other policies, such as encouraging energy-efficient appliances in residences or encouraging integrated energy systems in commercial structures, are designed to be applied to specific projects during design review.

The Downtown Plan is proposed to become a part of the San Francisco Master Plan and does not contain specific objectives, policies or implementing actions concerning energy. Energy objectives and policies of the Master Plan which are not contained within the Downtown Plan further define planning in San Francisco and the region. The Energy Policy component does not specifically address the downtown area, although it contains policies which are applicable to policies contained in the Downtown Plan.

Two policies contained in the Energy Policy component apply to existing structures. Policy 1 of Objective 2 would "Improve the energy efficiency of existing homes and apartment buildings." Policy 1 of Objective 3 would "Increase the energy efficiency of existing commercial and industrial buildings through cost-effective energy management measures." Objective 3 would "Promote effective energy management practices to maintain the economic vitality of commerce and industry." The Downtown Plan would encourage preservation of existing residential and commercial structures without specifically requiring that their energy efficiency be brought up to current standards. Preserving existing structures would result in decreased demolition and construction energy requirements, and would decrease new commitments of energy. However, energy would be used more efficiently in the operation of new structures. If existing structures were preserved and upgraded to current building energy conservation standards, the demolition and construction energy requirements would be reduced while energy efficiency would equal that of new structures.

Policy 4 of Objective 3 would "promote commercial office building design appropriate for local climate conditions" and is indirectly addressed by several Downtown Plan policies. The Downtown Plan would reduce overall heights of buildings, which would result in structures with lower energy budgets, based on net leasable space (see discussion on p. III.G.6). Tapering of upper stories, increased setbacks at upper stories, and preservation of street-level sunlight on designated sidewalks and open space would preserve more sunlight at ground-level than development expected under the existing Planning Code, providing more opportunity for daylighting and passive solar applications. Downtown Plan policies to encourage light-toned exterior facades and to change the Planning Code to encourage deep-set windows would also be addressed by this policy.

Objective 4, which would "Increase the energy efficiency of transportation and encourage land use patterns and methods of transportation which use less energy", contains six policies to achieve this objective.

Policy 1 of Objective 5 to "Develop land use policies that will encourage the use of renewable energy resources" and Objective 5 to "Promote the use of renewable energy resources" would also be indirectly addressed by Downtown Plan policies to preserve street-level solar access.

General Impacts of Increased Downtown Development on Future Opportunities for Energy Conservation

New development in the downtown would increase the amount of solid waste going to regional landfills. Paper wastes are about 30% to 40% of the waste from commercial development in the city./24/ Many of the materials sent to landfills, such as paper, glass, and aluminum, may be recycled. Recycling would decrease the energy needed to collect and transport solid waste to disposal areas and to operate waste disposal facilities. Recycling would also decrease the energy required for extraction, refining, and fabrication of raw materials for manufactured goods. The increased development density in the downtown between 1984 and 2000 would enhance the economic feasibility of recycling programs.

Increased density of development in the downtown would also increase the potential for cogeneration and for expansion of the district steam heating system. Cogeneration is most feasible for large buildings or complexes of buildings. The district steam heating system's efficiency would increase and its per-unit delivery costs would decrease if it were to serve more customers on its existing distribution pipelines. The probability of its doing so is related to development density.

Additional development in the downtown would affect the potential for energy conservation through passive solar energy applications such as passive solar heating and daylighting. In general, as development density increases, the amount of sunlight reaching the lower levels of buildings would decrease and existing buildings that derive light and heat from sunlight would increase their use of electric lighting and electric or natural gas space heating. Thus, opportunities to incorporate solar design principles into the design of new buildings would become more limited. However, the Downtown Plan by reducing overall building heights, tapering of upper stories, and preserving street-level sunlight access on designated sidewalks and open space, would mitigate this potential impact to some extent.

Cumulative Regional Impacts of Increased Energy Consumption

Development in downtown San Francisco, along with development throughout the PG&E service area, would contribute to cumulative demand for increased extraction, transportation, generation, and distribution of natural gas, oil, and other fuels as well as to increased geothermal and hydroelectric development. Some energy sources that are being considered would require separate environmental review by the proper agency before they could be developed. Decision makers could be faced with trade-offs between economic and environmental protection issues involved when energy sources with adverse environmental effects are considered for development. Off-site aspects of energy consumption, such as off-shore oil development, power plant and dam construction and operation, supertankers, refineries, and regional oil and natural gas pipelines, could lead to adverse environmental effects.

NOTES - Energy Resources and Utilities

/1/ Lee Cordner, Industrial Power Engineer, Pacific Gas and Electric Company; telephone communication, February 7, 1984.

/2/ Department of City Planning, 1980, Energy Supply and Consumption Patterns: Trends and Prospects, 1975-1985.

/3/ Pacific Gas and Electric Company, March 1982, "Summary of Loads and Resources (Form Number R-1A)."

/4/ Pacific Gas and Electric Company, April 1982, "Future Generating Facilities and Changes to Existing Facilities (Form No. R-6)."

/5/ The Glossary contains definitions of technical terms used in this section.

/6/ Richard Davin, Coordinator of Nuclear Information, PG&E; telephone conversations, October 3 and 5, 1983.

/7/ California Energy Commission, 1983, Securing California's Energy Future: 1983 Biennial Report.

/8/ Don Bules, Department of City Planning; personal communication, October 13, 1983.

/9/ British thermal units (Btu) are units of heat energy. One Btu is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level. All forms of energy can be converted to heat energy. Btu values given in this report are "at-source" values, which means that they have been adjusted to account for losses in energy that occur during generation and transmission of the various forms of energy, as specified in Energy Conservation Design Manual for New Nonresidential Buildings, Energy Resources Conservation and Development Commission, 1977; and Energy and Transportation, Apostolos, J.A., W.R. Shoemaker, and E.C. Shirley, 1978.

/10/ Estimate based on most current data and projections of future trends; see Appendix N for detailed description of estimation methods.

NOTES - Energy Resources and Utilities (Continued)

/11/ Electricity prices for 1984, 1990, and 2000 are from California Energy Commission, 1983, Securing California Energy Future, and have been adjusted to constant 1983 dollars using escalation factors from California Energy Commission, 1981, Energy Tomorrow - Challenges and Opportunities for California.

/12/ PG&E records show that the City required 3.61 billion kWh in 1980, 3.66 billion kWh in 1981, and 3.66 billion kWh in 1982 (Gerald Tyson, Marketing Supervisor, PG&E; letter communication, November 7, 1983). New development between 1981 and 1984 in the downtown would increase City-wide requirements by about 150 million kWh (see Appendix N). PG&E also projects city-wide electricity demand to be 775 MW in 1984 and 884 MW in 1990.

/13/ Herbert Luders, Industrial Power Engineer, PG&E; letter communication, April 13, 1982.

/14/ Pacific Gas and Electric Company, April 1982, "Summary of Requirements and Resources (Form No. R-2)."

/15/ Natural gas prices for 1984, 1990, and 2000 are from California Energy Commission, 1981, Economic Assumptions for Building Standards Cost Effectiveness, and have been adjusted to constant 1983 dollars using escalation factors from the same report.

/16/ Moodys Investors Service, 1982, Moodys Public Utility Manual.

/17/ The district supplied about one billion Btu to 226 customers in 1982 and it is assumed that the number of customers and amount of steam used will not change substantially between 1982 and 1984.

/18/ David Rubin, Department of City Planning; personal communication, October 27, 1983.

/19/ Electricity costs for transportation energy were estimated using the same factors as for building electricity use (see notes 11 and 15). While BART and Muni receive power at substantial discounts compared to the average price of electricity to consumers, the latter is felt to be more representative of the value of that power and to be more comparable types of energy. Gasoline and diesel fuel prices are 1983 prices as reported in Energy Watch (California Energy Commission, 1983); no change in real (constant 1983) prices could be assumed for 1990 and 2000 projections because of uncertainty in the oil market.

/20/ California Administrative Code Title 24, Energy Conservation Standards For New Residential and Non-Residential Buildings.

/21/ The Energy Policy component of the Environmental Protection Element of the Comprehensive Plan was adopted by Resolution No. 9409 of the San Francisco City Planning Commission on June 3, 1982.

/22/ Citizens Energy Policy Advisory Committee, 1982, Recommendations for Reducing Community Energy Costs.

/23/ 1990 energy estimates are based on development forecasts provided in Section IV.B, Land Use and Development. Energy estimates for many of these projects are available from EIRs on the projects. Some of the projects included in the 1990 estimates, however, did not require an EIR. Also, some of the EIRs for projects included in the 1990 analysis did not estimate construction energy. For these reasons, building construction energy

NOTES - Energy Resources and Utilities (Continued)

reported herein was estimated from total sq. ft. of new construction using construction energy factors from: Hannon, B. et al, 1978, "Energy and Labor in the Construction Sector," Science 202: 837-847. Because these factors do not account for excavation, demolition, debris removal, or grading and no other source of this information was identified, these latter components of construction energy costs were excluded from the analysis. The 2000 construction energy estimates are also based on these construction energy factors.

/24/ Don Bules, Department of City Planning, personal communication, October 28, 1983.

/25/ A. T. Kenworthy, "Observations on Climate and Building Design with Particular reference to Building Aerodynamics and Its Effects on Fuel Consumption in Multi-Story Dwellings," Energy and Buildings, 1982, vol. 4, pp. 173-175.

/26/ Fraqs, A. P., 1983, Engineering Evaluation of Energy Systems.

/27/ Pacific Gas & Electric Company estimates peak demand for new, air conditioned commercial space at 5 watts per sq. ft. (Lee Cordner, Industrial Power Engineer, PG&E; telephone communication, December 16, 1983). This factor and floor area of new construction were the basis for this increment of new electricity demand.

/28/ A range of values is presented here for electricity consumption because revisions to the Title 24 building energy conservation standards, proposed in 1983 but not yet adopted, would reduce energy consumption in offices. The proposed revisions would primarily address use of electricity; in this analysis, the decrease in energy use is attributed entirely to reduced use of electricity. If implemented prior to 1990, these new standards could reduce electricity consumption by up to 20 million kWh in 2000.

/29/ All of the thermal energy contained in the electricity and natural gas will be converted to waste heat. About two-thirds of the waste heat produced by use of electricity, however, occurs during its generation outside the downtown. About 10% of the waste heat generated by use of natural gas also occurs outside of the downtown. The remainder is released in the downtown at the point of use.

/30/ California Department of Transportation, 1978, Energy and Transportation Systems.

/31/ Linda Hausrath, Recht-Hausrath & Associates, Memorandum, December 14, 1983.

/32/ Energy consumption data are not available for the "region" as defined in other sections of this report. Therefore, the Pacific Gas and Electric Company's northern California service area is used to provide a regional perspective for the Downtown Plan. This area is larger than the region discussed in other sections of this report. PG&E provides service to about three million residential and about 400,000 commercial/industrial customers in its northern California service area. The California Energy Commission (CEC) has estimated (Proposed Nonresidential Buildings Standards EIR, 1983) that, by 1992, the PG&E service area will contain about 67 million sq. ft. of low-rise office space and about 14 million sq. ft. of high-rise (4 or more stories) office space. By 2002, the CEC estimates that low-rise office space will have increased to about 122 million sq. ft. and high-rise office space will have increased to about 26 million sq. ft.

H. ARCHITECTURAL/HISTORIC RESOURCES AND URBAN DESIGN

SETTING

Architectural/Historic Resources

Introduction

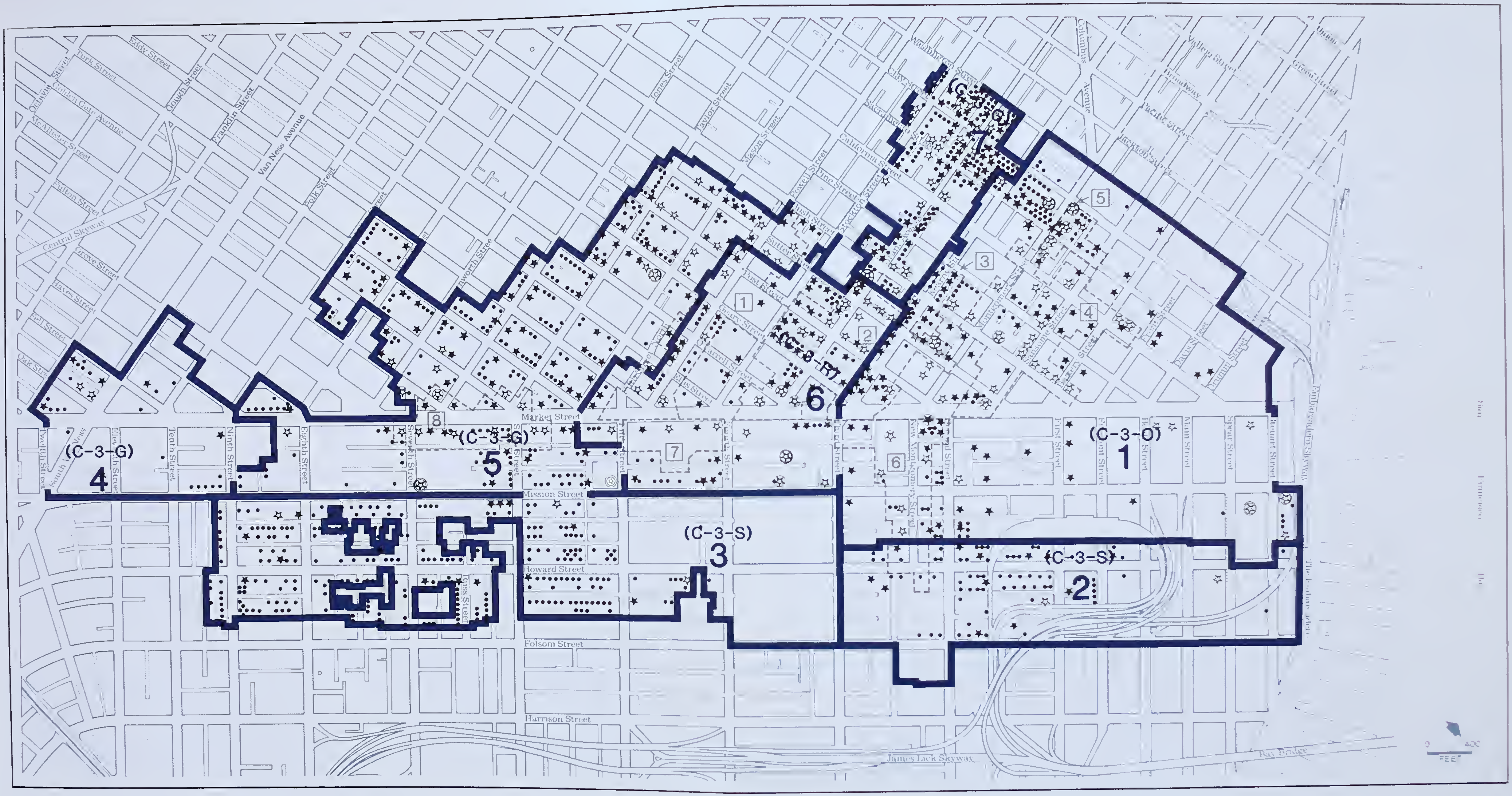
Buildings in San Francisco's downtown were, until recently, the product of a period lasting from 1906 until about 1930. Downtown was characterized by light-colored, masonry-clad structures from six to twelve stories in height with distinctive and eclectic designs, and related to adjacent buildings by use of similar cornice and belt course lines, and sympathetic materials, scales, and colors. Buildings were constructed to the street and property lines, and incorporated ornamentation and articulation, creating a pedestrian scale. During the 1920's many highrises were larger, but they blended with buildings constructed soon after the earthquake and fire by use of similar scales, styles, materials, colors, solid to glass ratios, details, and belt courses.

From the Depression until the 1950's, no major buildings were constructed downtown. When construction resumed, new buildings were of the International Style, and consisted of rectilinear boxes with large windows and unornamented walls without setbacks or cornices.

In recent years, many of the older buildings have been demolished to make way for new development. In an attempt to identify the City's architectural resources, surveys of buildings in the downtown district were conducted in 1976 by the Department of City Planning (DCP) and in 1979 by the Foundation for Preservation of San Francisco's Architectural Heritage (Heritage). These surveys followed the 1968 Junior League Survey published as Here Today: San Francisco's Architectural Heritage.

Surveys of Architectural/Historic Resources

Surveys of individual buildings by the DCP/1/ and Heritage/2/ have identified a total of 1,393 structures as individually significant or contributory architectural resources (see Figure IV.H.1). The DCP survey examined all buildings in the City, including those in the Downtown C-3 District. The survey was conducted between 1974 and 1976, and assigned two kinds of ratings to each rated building: (1) an overall rating of architectural



ELIGIBLE HISTORIC DISTRICTS IDENTIFIED BY HERITAGE

☆	HERITAGE A BUILDING
★	HERITAGE B BUILDING
•	HERITAGE C BUILDING
☆	CITY LANDMARK
⊛	NATIONAL REGISTER LANDMARK

1	POWELL STREET CORRIDOR
2	RETAIL-SHOPPING DISTRICT *
3	KEARNY STREET DISTRICT *
4	FINANCIAL DISTRICT
5	COMMERCIAL-UPPER MONTGOMERY STREET DISTRICT
6	NEW MONTGOMERY AND MARKET STREET DISTRICT
7	EMPORIUM MARKET STREET DISTRICT
8	MARKET STREET LOFT/ THEATER DISTRICT

NOTE: See Appendix E for definitions of terms and Figures E.1 - E.10 for large-scale maps of resource sites.
Existing Use Districts are shown in blue.

* National Register Nomination pending

FIGURE IV.H.1:
DESIGNATED ARCHITECTURAL RESOURCES IN C-3 DISTRICT

SOURCE: Roger Owen Boyer and Associates

appearance and (2) a summary rating that took into consideration the building's first rating as well as its importance to the streetscape./3/ Numerical ratings from a low of "0" to a high of "5" were assigned to each rated building in each rating category. In general, buildings with summary ratings of "3" or higher from the DCP survey are considered by the survey participants to represent approximately the best two percent of the architecture in the City./4/ Buildings selected for rating in the survey represent approximately the best 10% of the City's buildings in terms of architectural quality.

Heritage has conducted two surveys, which together have examined the entire C-3 District. The first survey, which examined a major portion of the C-3 District, including most of the Central Office District (Subarea 1), was completed in 1979 and is presented in the book entitled Splendid Survivors. The second, or Supplemental Survey, examined the balance of the C-3 District and was completed, as revised, in December 1982. The Supplemental Survey is available from Heritage, but has not been published in book form./2/

Each Heritage survey was conducted using the same methodology (see Appendix E). The surveys assigned a rating of A, B, C, or D to each rated building. An "A" rating indicates a building of highest importance; a "B" rating, a building of major importance; "C", a building of contextual importance; and "D" a building of minor or no importance./4/ Unlike the 1976 DCP survey, which examined both old and new buildings, the Heritage survey concentrated on "historic" buildings. Therefore, no buildings built after 1945 were rated in the Heritage surveys.

The ratings and geographic distributions of architectural resources identified in the DCP and Heritage Surveys are shown in Figure IV.H.1. The exact location, name, address, rating, Assessor's block and lot number, status, and location of each building rated A, B or C by Heritage or 3, 4 or 5 by DCP in the 1976 survey are presented in Appendix E (see Table E.3 and Figures E.1-E.10). These buildings are referred to as "recognized architectural resources" in the following discussion.

Distribution of Architectural/Historic Resources in the Downtown District

Recognized architectural/historic resources are concentrated in several areas of the C-3 Use District, most notably in and around the Central Office District (Subarea 1) and the Retail District (Subarea 6). The City's primary retail district, generally bounded by Grant Avenue, Market, Bush and Mason Streets, retains many of the buildings from the post-fire era. A concentration of architectural/historic resources also occurs in the northeastern portion of the Chinatown District (Subarea 7) in the vicinity of Grant Avenue. Streets in the Central Office District that have numerous architectural/historic resources include California, Sansome, Sutter and Bush Streets.

Another grouping of important architectural/historic resources is on Kearny Street, along the western edge of Subarea 1. A concentration of rated retail buildings of significant architectural character are also located along Maiden Lane from Kearny Street to Union Square (Subarea 6). Another concentration of architectural/historic resources is located along Second and New Montgomery Streets (Subarea 2).

Although the largest concentrations of rated architectural/historic resources are found in the above areas, many other buildings of architectural/historic importance are located throughout the remaining portions of the C-3 District. The area west of Fifth Street and south of Market Street (Subarea 3) contains a variety of buildings of contextual importance which give it a distinct architectural character. The relatively small Market-Van Ness Area (Subarea 4), south of the Civic Center, has the fewest number (29) of rated structures of any of the seven C-3 District subareas.

Table IV.H.1 provides a summary of architectural resources in the C-3 District by subarea.

National Register of Historic Places and City Landmarks

Nine rated buildings in the C-3 District are listed on the National Register of Historic Places maintained by the National Park Service of the U.S. Department of the Interior. The National Register lists properties of local, state, or national significance. Six of these properties are in Subarea 1; the balance is scattered throughout the remainder of the C-3 District (see Figure IV.H.1)./5/

Six of the nine National Register properties as well as 22 additional buildings have been officially designated under Article 10 of the City Planning Code as City Landmarks by the City and County of San Francisco. Of this total of 31 buildings that are National Register

TABLE IV.H.1: DESIGNATED ARCHITECTURAL RESOURCES IN THE C-3 DISTRICT, BY SUBAREA, 1984

Subarea	National Register Properties only	City Landmarks only	National Register Properties and City Landmarks both	TOTAL National Register Properties and City Landmarks (c)	HERITAGE RATING (a) Total A	Total B	Total A+B	Total C	TOTAL A+B+C	Additional Buildings Rated "3" or Higher by DCP (a,b)	Total A+B+DCP (e)	TOTAL A+B+C+DCP
1	1	12	4	17	47	84	131	188	319	0	131	319
2				0	2	12	14	65	79	1	15	80
3				0	3	13	16	249	265	0	16	265
4				0	2	6	8	21	29	0	8	29
5	2	1	1	4	29	87	116	243	359	2	118	361
6		7	1	8 (d)	25	53	78	80	158	1	79	159
7		3		3	22	41	63	117	180	0	63	180
TOTALS	3	23	6	32	130	296	426	963	1,389	4	430	1,393

(a) See Appendix E for definitions of rating scales.

(b) Number of buildings rated "3" or higher by DCP, but not rated by Heritage.

(c) All but one (see (d), below) National and City Landmark are also rated "A" or "B" by Heritage and are shown in the appropriate Heritage Rating column.

(d) The V.C. Morris Building on Maiden Lane in Subarea 6 is a City Landmark, but is not rated by Heritage because it was built after 1945.

(e) DCP's official list of "Architecturally and/or Historically Significant Buildings in the Downtown", Resolution No. 8600, dated May 29, 1980, includes 87 A's, 162 B's and 28 DCP's, for a total of 277 A's, B's and DCP's.

SOURCE: Roger Owen Boyer and Associates

Places and/or City Landmarks, 17 are located in Subarea 1, eight are in the vicinity of Union Square (Subarea 6), two are in Chinatown (Subarea 7), and four are in the Tenderloin/South of Market (Subarea 5) (see Figure IV.H.1)./5/

Historic Districts

Eight districts have been identified by Heritage in Splendid Survivors as eligible for designation as historic districts under the criteria of the National Register (see Figure IV.H.1)./6/ Heritage, in cooperation with the State Office of Historic Preservation, is presently preparing a formal National Register nomination for two historic districts, the proposed Union Square Retail District and the proposed Kearny Street District (Districts 2 and 3)./3/ The final status of these historic districts is pending. In addition, the San Francisco Landmarks Preservation Advisory Board initiated designation of six parcels fronting the north side of the 100-block of Sutter Street as the "Hallidie Building Block - Retail Historic District" in October of 1982. The Board subsequently tabled the proposed designation./7/

Trends in Demolition and Preservation

According to Department of City Planning records, approximately 37 rated (A, B, C, or "3" and higher) architectural/historic resources were demolished in the C-3 District between 1979 and October of 1982 (see Appendix E, Table E.4). This represents a rate of approximately nine rated buildings lost per year. Of this total, two were National Register of Historic Places properties or City Landmarks, four others were rated "A" and 13 were rated "B".

Efforts have increased in the past several years to discourage the demolition of rated architectural/historic resources and to encourage harmony in the design of older buildings and new development. For example, the Bank of Canton office tower is being built above, around and behind the old U.S. Subtreasury, a designated City Landmark, and the 466 Bush Street building incorporates Old Fire Station No. 2, a designated City landmark, into its site plan. This new office tower would be built on the side of and behind the landmark. For the 101 Montgomery Street Building, one of the conditions of approval was the preservation of the adjacent B-rated California Pacific Building, which has been integrated into the project. The addition to the First Nationwide Savings Building at 700 Market Street accentuates the vertical orientation and proportions of the former building while allowing the composition of the addition to be modern in style. The tower addition to the Bank of California Building repeats the historic building's material, color and texture.

The trend toward preservation of architectural/historic resources, and their incorporation into new downtown development projects, has occurred through the City's exercise of conditional use and discretionary review procedures, and in a limited manner through provisions of Article 10 of the City Planning Code, which authorizes designation of landmarks and historic districts and requires review of proposed alterations to such structures. Most recently, the Planning Commission has disapproved in the case of 222 Kearny Street, the preservation of fragments or features of a recognized architectural/historic resource.

Streetscape and Pedestrian Amenities

Introduction

The transportation and business functions of the downtown have made its streets a basic determinant of building location, and in some cases building form. The way in which pedestrians use streets is an important factor in the quality of life downtown. This section describes the qualities of streets and their features in downtown San Francisco, and discusses the physical characteristics of street envrionments in the seven subareas of the C-3 District.

Pedestrian orientation in a city demands the "expressive qualities that convey the 'feeling' of a street: a sense of ready access, of clear direction and of well-defined boundaries."/8/ The facades and cornice lines of buildings help give streets this definition. As a means for pedestrian orientation, streets often function as continuous channels, which in some cases are free of the feeling of termination. The series of breaks in a street (caused by open spaces, deep setbacks, and cross-streets) divide a street into segments. The indiviual features of buildings and other elements of the streetscape articulate the street's character on a smaller scale. Highrise buildings, for example, both contain and dominate the space of the street. In other cases, where the width of the street is greater than the heights of buildings, the street functions as the major visual element. In most cases, the street space functions as the common shared element in the relations among separate goals: street and house, street and shop, street and work, and street and transit system."/9/

In addition to functioning as corridors for pedestrian movement, streets serve as centers for personal activity and communication. Such functions are enhanced when buildings allow for visual contact between their ground floor windows and the street. Plazas, parks and interior public spaces can also extend the boundaries of the street and create the framework for more intense activity and visual interest. A street so described also benefits from density of pedestrian activity, and in some cases, automobiles contribute to the sensation of liveliness on a street. In most cases, however, automobiles weaken the function of a street as a center for pedestrian activity.

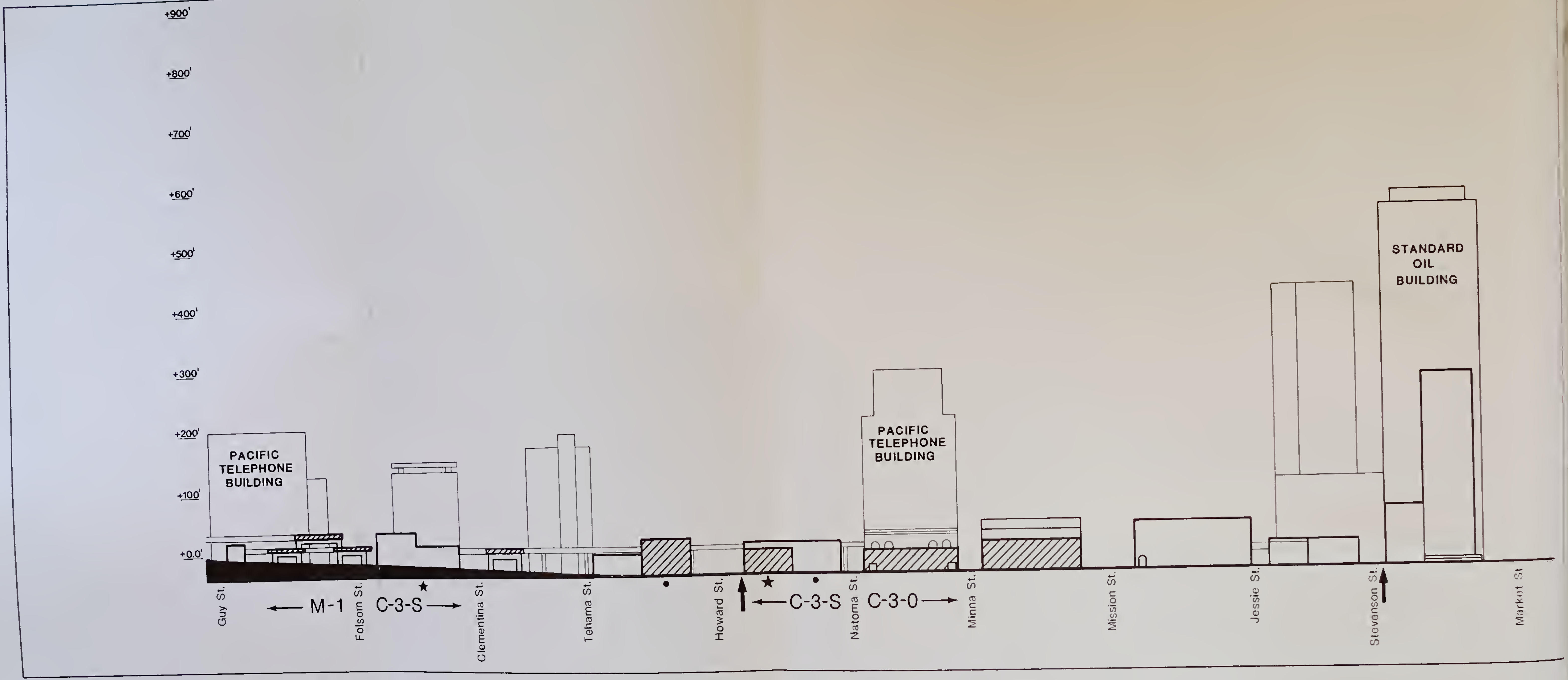
Isolated towers with low site coverage give little definition to a street. If their open spaces are private, they detract from the potential for street activity. Other breaks in the enclosing street such as gas stations and parking lots also diminish the qualities a street can offer the pedestrian.

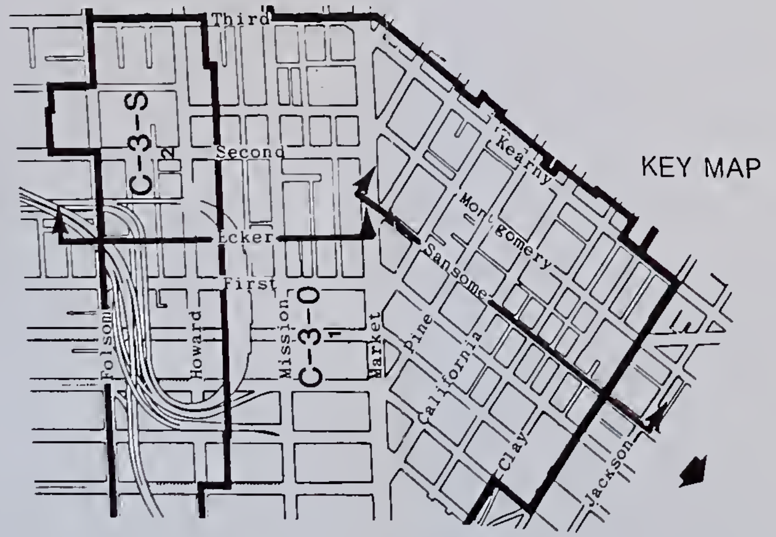
The Street Environment in the C-3 District

The existing development of downtown San Francisco is represented in the cross-section diagram shown in Figure IV.H.2. This figure shows a westerly view from the center of Sansome and Ecker Streets as they intersect various height, bulk and use districts in the C-3 District./10/

The diagram is a pictorial scale-drawing of existing buildings, including those scheduled to be completed by 1984. To distinguish the distance of a building from the viewer, those that front on Sansome and Ecker Streets are outlined with a heavy-weight line and those up to one block beyond are shown with a medium weight line. All buildings between Sansome and Montgomery Streets, and Ecker and Second Streets are shown. A few major buildings located beyond this area are also shown in a light-weight line. Building details and architectural configurations greater than three feet in their smallest dimension are generally shown; other details are omitted. As shown in Figure IV.H.2, the street environment in the C-3 District varies from narrow canyon-like streets lined with tall buildings to wide corridors lined with two-and three-story buildings.

Two case-study locations that illustrate common streetscape conditions in the C-3 district have been selected from the cross-section (Figure IV.H.2). These locations, at the intersection of Pine and Sansome Streets, and the mid-500 block of Howard Street, are emphasized in the following discussions of subareas./10/





KEY MAP

ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

▨ BUILDING IN SECTION

□ BUILDING AT STREET FRONTAGE

□ BUILDING AT DEPTH OF UP TO ONE BLOCK

□ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

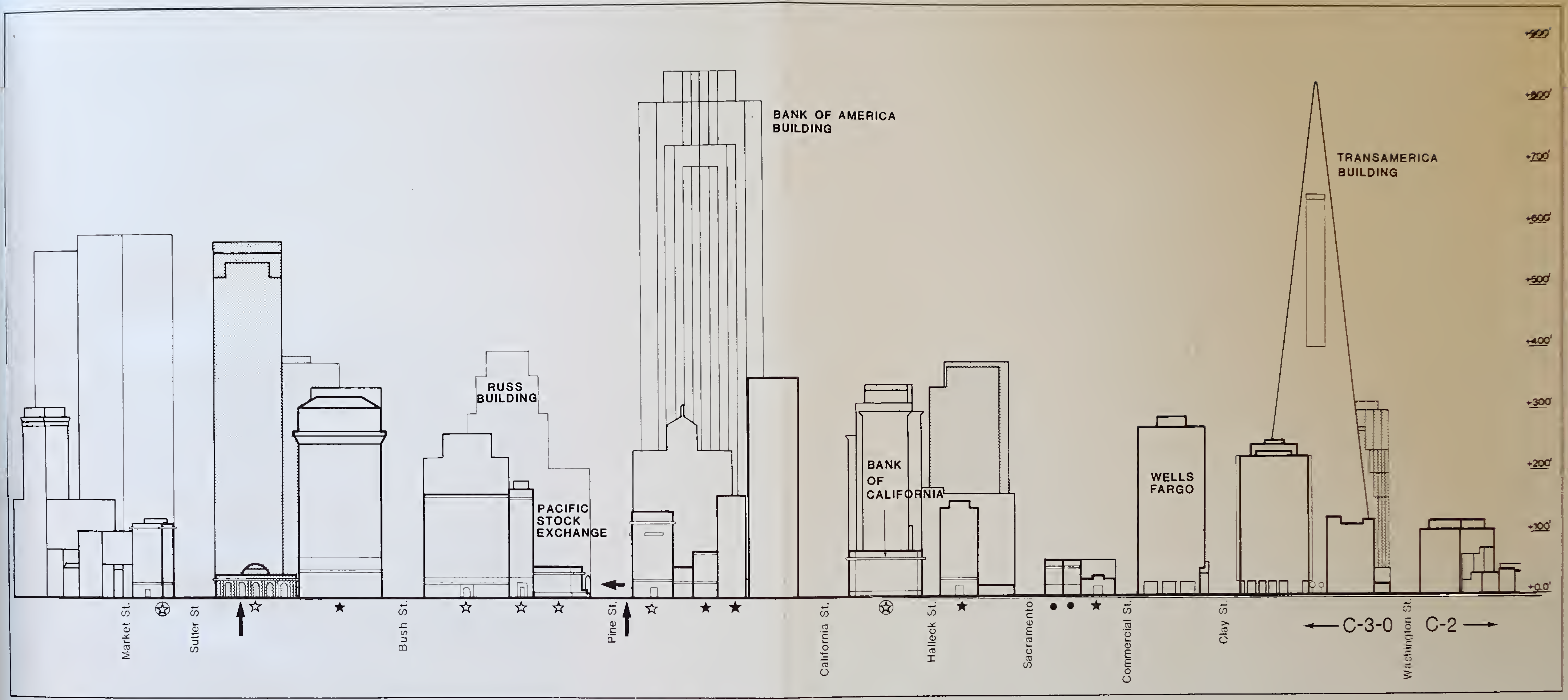
ARCHITECTURAL RESOURCES

✪ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

• HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

☐ BEFORE 1983

▨ 1983-1984

PHOTO LOCATIONS

→ LOCATION OF STREET-LEVEL PHOTO
(See Figures IV.H.3, IV.H.4, IV.H.11 and VII.13 - VII.19)

↑ LOCATION OF FISHEYE PHOTO
(See Figures IV.H.12 - IV.H.15)

FIGURE IV.H.2:
C-3 DISTRICT STREETSCAPE, 1984

SOURCE: Roger Owen Boyer and Associates

Subarea 1 (Central Office District). Highrise buildings create a canyon-like effect on Pine Street, which is representative of many streets north of Market Street. Buildings are generally built to lot lines, and most buildings, old and new, have intermediate cornice lines at their first or second story that contribute to pedestrian scale. The feeling of enclosure on Pine Street is accentuated by the visual angle of buildings on Market Street, at the eastern terminus of the street. The richness of detail and ornament on older buildings, many of which are designated architectural resources (see p. IV.H.1), contributes to pedestrian interest and diminishes the visual dominance of highrise buildings.

Street level store fronts are generally occupied by financial and banking uses. Pedestrian activity is highest around the noon hour and in the early weekday mornings and late afternoons due to the nearby BART and Muni stops on Market Street. During evenings and weekends, pedestrian activity is relatively low. The few existing restaurants and shops are typically open only during business hours. The street is a major one-way artery (heading west) and traffic is heavy during the workday, particulary at the peak hours when parking is prohibited. At other times, trucks double park in the street and pedestrians jaywalk across Pine Street.

The Pacific Coast Stock Exchange (see Figure IV.H.3) is one of the few remaining lowrise buildings on Pine Street. The building, a one-story granite banking-temple, has a series of broad steps leading up to a large colonnade which fronts the main trading hall. The entrance to the trading hall is flanked by two monolithic granite sculptures. Due to its location on the south side of Pine Street and the orientation and height of adjacent buildings, the building receives little sunshine.

Despite its frequently shaded location, the Pacific Coast Stock Exchange contributes to streetscape conducive to pedestrian activity. The north side of the building is setback about 12 feet from the property line along Pine Street, effectively widening the sidewalk. Along Sansome Street and Century Place the building is set back about 15 feet making room for a raised planter where people sit. There are no street trees other than those in the planters. The building's relationship to its surrounding streets offers an example of how a single building can provide pedestrian amenity in an urban setting.

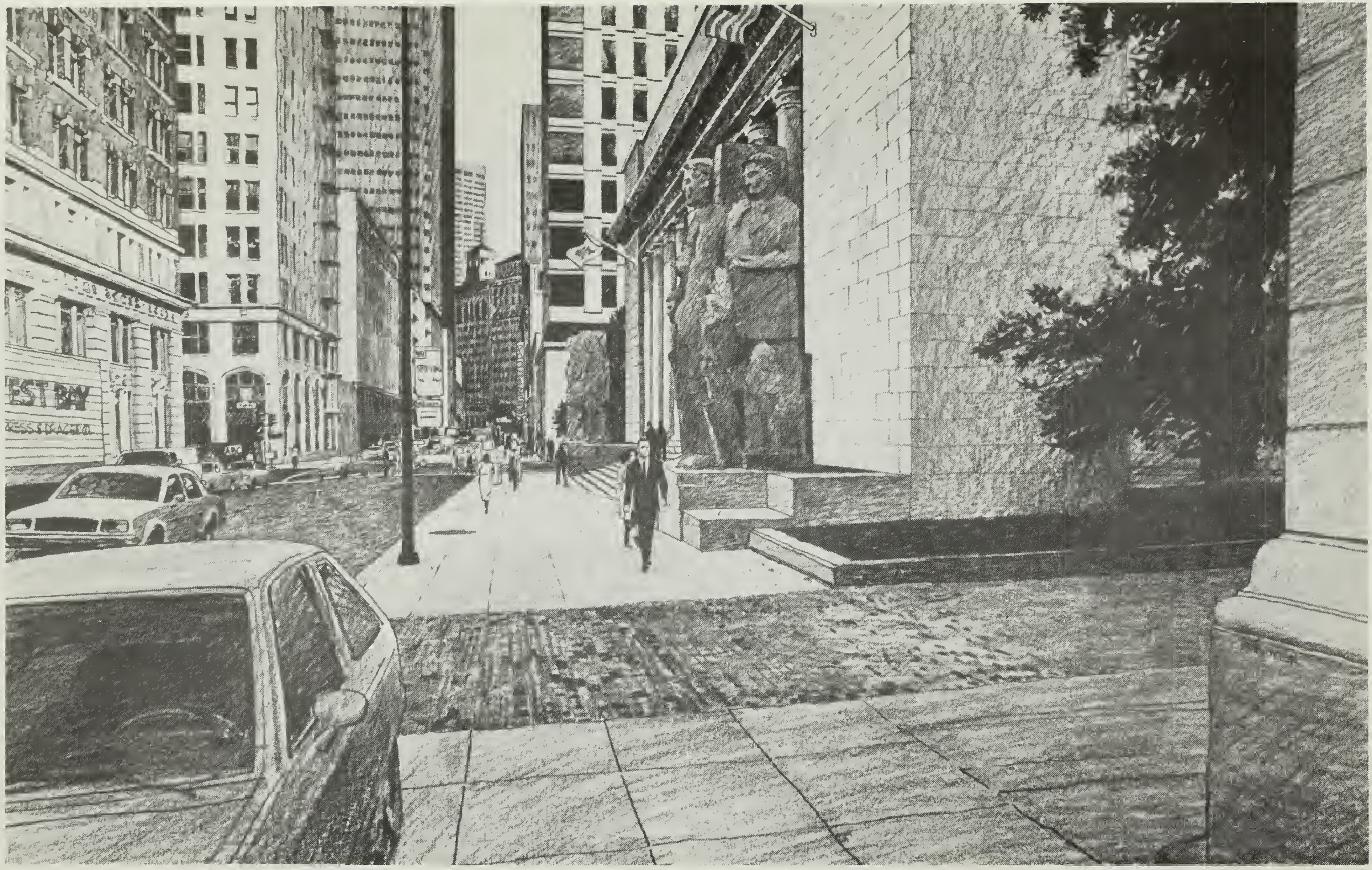


FIGURE IV.H.3:
PINE STREET/ SANSOME STREET
INTERSECTION, 1984

SOURCE: Roger Owen Boyer and Associates

Subarea 2 (East South of Market). The second urban design case study location is in Subarea 2, on Howard Street South of Market Street (see Figure IV.H.4). Howard Street offers a visual contrast in its street environment to that of the Central Office District. In Subarea 2 streets are relatively wide and building heights low, allowing for considerable sunshine. Nonetheless, the streetscape is not generally conducive to pedestrian activity. Howard Street is a relatively wide (92 feet in comparison to 69 feet for Pine Street) one-way street heading west which is heavily traveled during the peak hours. Pedestrian traffic is relatively light during the day and negligible at night since there are few commercial or retail support activities in the area. The street is bounded by lowrise buildings (three to five stories) built to property lines, and contains office and light industrial uses. The area is characterized by poorly maintained sidewalks and curbs, driveways cutting across the sidewalks, building entrances without setbacks at the property lines, fire escapes built onto the fronts of buildings obscuring any lines of architectural continuity, and a variety of types, styles and sizes of buildings.

From the case study location, the view to the west down Howard Street is framed by the freeway overpass leading to the Transbay Bus Terminal. To the east, a freeway overpass leading to the Main Street exit frames a foreground view of new mid-rise office buildings of about 12 stories along Main and Spear Streets.

This section of Howard Street is located in the lowest density area of the C-3 District. The street functions more as a corridor for traffic than as a center for pedestrian activity. The lack of retail uses, open spaces, and the presence of considerable vehicle traffic reduce the pedestrian amenity of the street.

The case study site is occupied by a two-story automobile repair garage, and is located mid-block on Howard Street between 1st and 2nd Streets. The existing building is also shown in the C-3 District cross-section in Figure IV.H.2. The building is built up to the property line. The first floor has several openings for automobile doors, pedestrian doors and windows. The low window sills and the doors draw attention to the pedestrian scale of the lower portion of the building. Above, a horizontal cornice marks the second floor and a large, arched, multi-paned window is framed by a pitched parapet with a flagpole at its center. On this south-facing front, shadows articulate the brickwork, and the inset

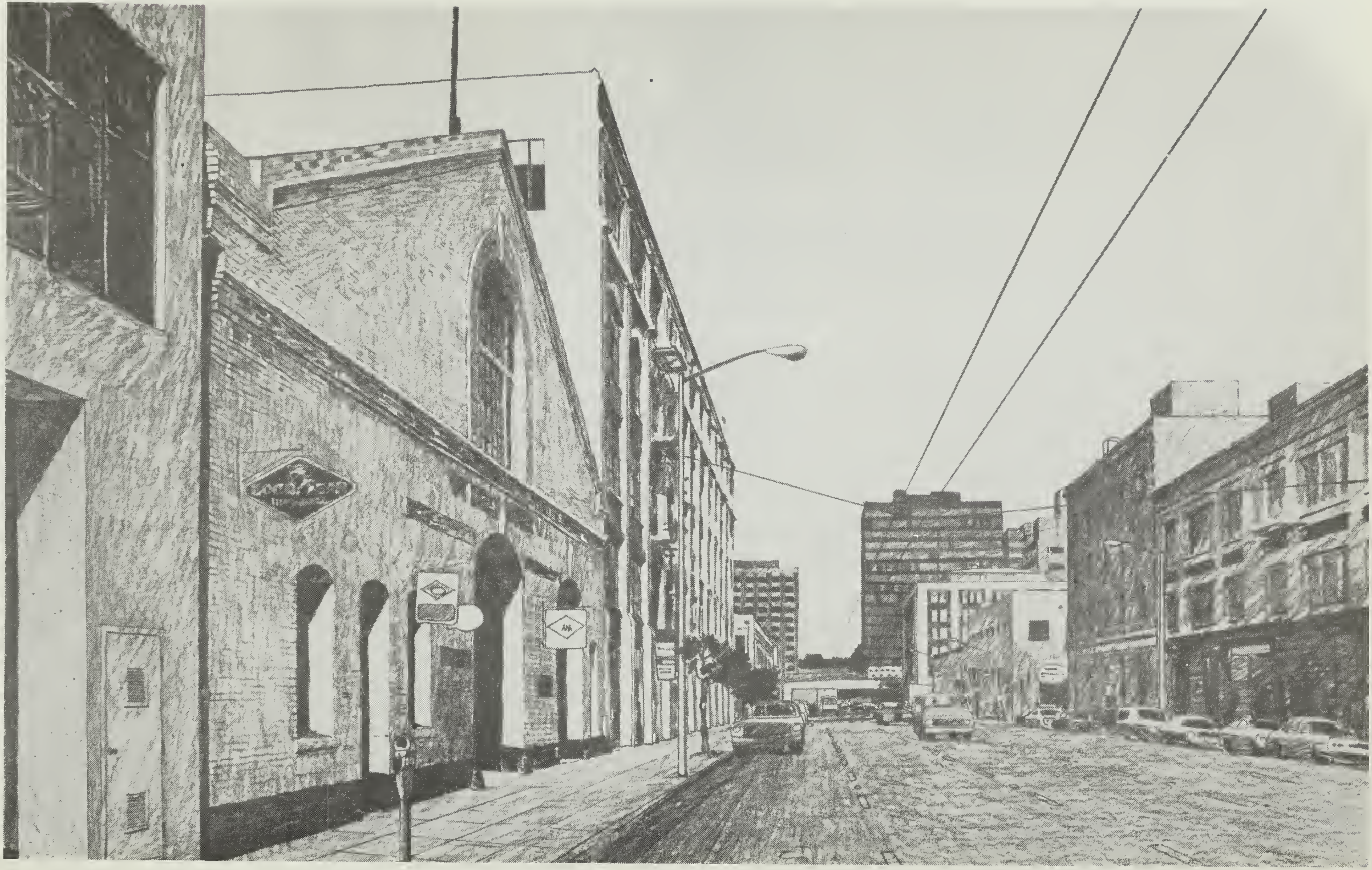


FIGURE IV.H.4:
522/528 HOWARD STREET, 1984 AND 1990

SOURCE: Roger Owen Boyer and Associates

windows and doors create a sense of depth to the facade. The remainder of the front is a painted white plane broken only by the simple, brick detailing of the cornice and parapet lines and several small advertising signs.

The urban design characteritics of streetscapes in much of the balance of the C-3 District may be characterized by reference to the two case study examples described above.

Subarea 3 (Central South of Market) and Portions of Subareas 4, 5, and 6 South of Market Street. Much of the area south of Market Street between Third and Twelfth Streets and Market and Folsom Streets (zoned C-3-G and C-3-S) is similar to the area of the Howard Street case study. The area also has some residential buildings; both existing, older, low-rise buildings along the narrow mid-block streets and newer high-rise residential buildings near Yerba Buena Center. Market and Mission Streets, have office, retail and commercial uses, and a few hotels are scattered toward the Civic Center. Buildings are generally taller (ten to fifteen stories) along Mission Street, particularly to the east. Otherwise the area is comprised of mostly low-rise (two- to five-story) buildings. In this area, the streetscape of Market Street, which has wide brick-paved sidewalks, trees at regular intervals, sitting areas, protected bus stops and intensive retail use, differs most from that of the Howard Street site.

Mission Street approaching Third Street has numerous retail stores and some of the characteristics of the Retail District. Pedestrian activity, however, is generally light, except close to Market Street and the eastern portion of Mission Street. At these locations, pedestrian traffic is moderate to heavy during the day and weekends, and light at night. Along Market Street, Mission Street, Third Street and Ninth Street, traffic is heavy during the morning and evening peak hours. Unlike the Howard Street site, the majority of the streets in the area do not provide distant views.

Subarea 4 (South Van Ness) North of Market Street. Retail and commercial uses are located in buildings in this area. The group includes some taller (fifteen to twenty stories) structures along Market Street. Pedestrian activity is moderate, compared to that of the Downtown Office District, especially during the evenings and the weekends. Traffic is also typically moderate, as wide streets and a large underground parking garage and other smaller surface parking lots serve to ease congestion.

Subarea 5 (Tenderloin) North of Market Street. The Tenderloin is a mixed use area (C-3-G) located generally north of Market Street to Sutter Street, and between Powell and Larkin Streets. The area shares some similarities with the Pine Street case study site, but buildings here are generally lower in height (four to 20 stories). Most structures were built before 1945. The predominant land uses are residential on upper floors and commercial on the ground floor with small retail stores, groceries, bars and various service establishments, and some hotels and theaters to the east along Geary Boulevard.

There are few distant views along the east-west streets, but from Sutter Street the view to the south extends to the South of Market area and beyond. St. Mary's Cathedral is visible along O'Farrell Street looking west past Van Ness Avenue. Pedestrian activity is moderate, but more intense at night in the vicinity of the hotels and theaters, and in the day around Union Square and the Civic Center. Traffic is also generally moderate, but heavier in the areas near Union Square the Civic Center, and along Geary and O'Farrell Street.

Subarea 6 (Union Square) North of Market Street. The retail district (C-3-R) around Union Square has a distinctive urban design character. Building heights (two to 25-stories) are lower than those common in the Central Office District, and the architecture is more varied.

Union Square serves as the traditional focus for the retail area, reinforced by the recent construction of three major department stores. The predominance of pedestrian-serving retail uses results in a more pedestrian-oriented streetscape. Overhanging awnings, projecting signs, street trees, and frequent store entryways with low-silled, brightly lighted shop windows are more common than elsewhere in the C-3 district. Pedestrian and vehicle traffic are consistently high during the day and at times in the evening. There are few distant views along the streets (except Grant Avenue to the south) but the focal point of the area, Union Square, can be seen from neighboring segments of adjacent streets.

Subarea 7 (Chinatown). Chinatown has few of the characteristics of the case study sites. The area is located north of Bush Street to Washington Street and between Kearny and Stockton Streets. Chinatown is at a higher elevation than the rest of the C-3 District. Most buildings are two to five stories in height, with several up to ten stories. They are situated along narrow, intensely developed streets. Uses are mixed residential, retail and commercial.

The streetscape is characterized by narrow sidewalks, a lack of street trees, and a large number of small retail stores, restaurants and service businesses. Buildings commonly have awnings, projecting signs, low-sill display windows and entrances which frequently lead to shops and restaurants on the second floors. The level of pedestrian activity is high during days and evenings and during the weekends. Crowded sidewalks are characteristic of this densely populated area. Vehicular traffic is generally slow-moving due to the narrow streets and double-parked trucks servicing the retail stores. The narrow streets afford restricted views of the northern portion of the Financial District to the east. Views of the Retail District are available from the southern part of Grant Avenue.

Wind, Sun and Shadow

The pedestrian-level climate within a city differs greatly from that outside the city. The physical and thermal mass of buildings exert a modifying effect on sunlight, temperature, humidity and wind./11/ Within a city, the pedestrian-level climate in the "downtown" area differs from that in the less-intensely developed residential areas. For pedestrians, these variables determine levels of comfort.

Wind

Average wind speeds and prevailing directions in San Francisco are shown in Table IV.H.2. Average wind speeds are greatest in the summer and least in the fall. Wind speeds generally are lowest in the morning hours and highest in the afternoon and evening.

The overall effect of urbanization on winds is to reduce windspeed because of the drag and friction generated by buildings./11/ However, while average windspeeds are lower in urban areas compared to the suburbs, highrise buildings can distort local wind fields dramatically. Near the base of a highrise, winds can be many times stronger than the ambient, undisturbed windspeed.

Several buildings in San Francisco are notorious for the windy, uncomfortable weather around them. Examples are the Fox Plaza, the Federal Building and the U.S. Assessor's Building. These are relatively free-standing, slab buildings that intercept large volumes of moving air. Such designs are known to cause wind accelerations at ground level. Since

TABLE IV.H.2: SAN FRANCISCO CIVIC CENTER CLIMATIC MEANS, AND SUN AND WIND CHARACTERISTICS

Month	Mean Maximum Temperature°F	Mean Minimum Temperature°F	Percent Possible Sunshine	Average Windspeed (mph)	Prevailing Wind Direction
January	56.0	45.7	56	6.7	north
February	58.9	47.9	62	7.5	west
March	60.1	48.5	69	8.5	west
April	61.2	49.3	73	9.5	west
May	62.5	50.9	72	10.4	west
June	64.5	52.8	73	10.9	west
July	63.8	53.2	66	11.2	west
August	64.8	54.0	65	10.5	west
September	68.8	55.5	72	9.1	west
October	68.2	54.6	70	7.6	west
November	63.2	51.5	62	6.3	west
December	56.8	47.2	53	6.7	north

SOURCE: National Oceanographic and Aerospace Administration, Technical memorandum NWS-WR-126, 1978.

1975, the City of San Francisco has required wind tunnel studies of proposed highrises as part of the environmental review process. This policy has at times resulted in design modifications to reduce winds.

North of Market Street the street grid runs approximately east-west and north-south. This results in a pattern of relatively strong winds along east-west streets, where wind is channeled along the street. Along north-south streets there are areas of shelter provided by upwind buildings.

South of Market Street, the street grid runs roughly southwest-northeast and northwest-southeast. This results in relative shelter from the prevailing west wind; but exposure to southwest and northwest winds.

Sunlight

Shadow patterns within the City are determined by the location of the sun in the sky, the degree and type of cloud cover or fog, and the geometry of nearby buildings. In San Francisco, and throughout the northern hemisphere, the length of shadows cast by buildings is greatest in late fall and early winter, when the sun is lowest in the sky, and least in late spring and early summer, when the sun is highest in the sky. The occurrence of clouds, of course, affects sunlight at ground level. The effect of clouds is often expressed as the "percent of possible sunshine." Table IV.H.2 shows the seasonal variation of this factor. Sunshine percentage is at a maximum in spring and in September. It is reduced in winter by clouds associated with storms, and in summer by fog and stratus clouds.

The construction of highrise buildings in downtown San Francisco has steadily diminished the extent and duration of sunshine at street level, and also has reduced the proportion of building surfaces and windows that receive sunlight. The severity of the effect of development on sunlight is roughly proportional to the density of development as measured by average built FAR, depending, of course, on the specific building form in relation to sun angles. Within the C-3 District, average FAR and sunlight reduction are greatest in the Central Office Subarea (Subarea 1) and in the Union Square Subarea (Subarea 6). Average FAR and sunlight reduction are least in the East and Central South of Market Subareas (Subareas 2 and 3). The effect of existing buildings in reducing sunlight has been quantitatively analyzed at four locations selected from the cross-section of the C-3 District along Sansome and Ecker Streets (see Figure IV.H.2) These four locations were selected to meet the following objectives:

- to represent a range of urban streetscapes;
- to represent areas that would be affected by future growth; and
- to represent typical locations within the C-3 district from which general inferences may be drawn.

Figure IV.H.12 (see Impacts) is a view of the sky taken with a fish-eye lens at the Sansome Street/Pine Street intersection./12/ In a fish-eye photograph, the entire sky is included, with the horizon at the outer edge. The path of the sun across the sky and its variation over a year are shown. Those times of the year and times of the day when sunshine reaches the location of the photo and when this location is shaded by existing buildings are also shown. The time of the day shown in the figure is based on solar time. During the period of late May to late October when Pacific Daylight Time is in effect, the local time is shifted one hour forward (e.g., at 1 p.m. on June 21 the sun's location in the sky is shown at noon solar time).

Figure IV.H.12 (see Impacts) shows that sunlight at the street level is reduced in fall and winter (between the equinox and winter solstice) by existing buildings. In the remainder of the year, some sunshine reaches the street in the morning hours and in the afternoon. The approximate north-south/east-west alignment of streets north of Market Street generally results in sunlight along north-south aligned streets around the noon hour (standard time). The Sansome Street/Pine Street intersection receives more sunlight than most intersections in the Subarea 1 Financial District because of the lowrise buildings including the Pacific Coast Stock Exchange, located immediately to the south.

Figure IV.H.13 (see Impacts) shows sunpaths at the Crown Zellerbach Plaza. The width of Market Street and the southwest-to-northeast alignment of highrise structures fronting the south side of Market Street result in most of the sunshine occurring in the afternoon. Virtually all the morning sunlight comes through the gap in the buildings caused by the 525 Market Street Plaza. In spring and summer, the plaza receives about five hours of sunlight, mostly after 11 a.m. In winter, sunlight is restricted to about one hour in the morning and one hour in the afternoon.

Figure IV.H.14 (see Impacts) shows sunpaths at the southeast end of the 525 Market Street Plaza, directly across from Ecker Street. Sunlight here is restricted by surrounding buildings to about three to four hours a day in all seasons. Although the buildings on the south side of Stevenson Street are only three to four stories high, the narrowness of the street (40 feet) causes even these short buildings to shade the Plaza.

Figure IV.H.15 (see Impacts) shows sunpaths at the north side of Howard Street (between 522 and 528 Howard). Sunlight duration here ranges from about six hours in winter to eight hours in summer.

Temperature

Mean temperatures in San Francisco are shown in Table IV.H.2, page IV.H.17. The seasonal and daily variation of temperature is typically relatively small due to the moderating effect of the Pacific Ocean and Bay.

Pedestrian Comfort

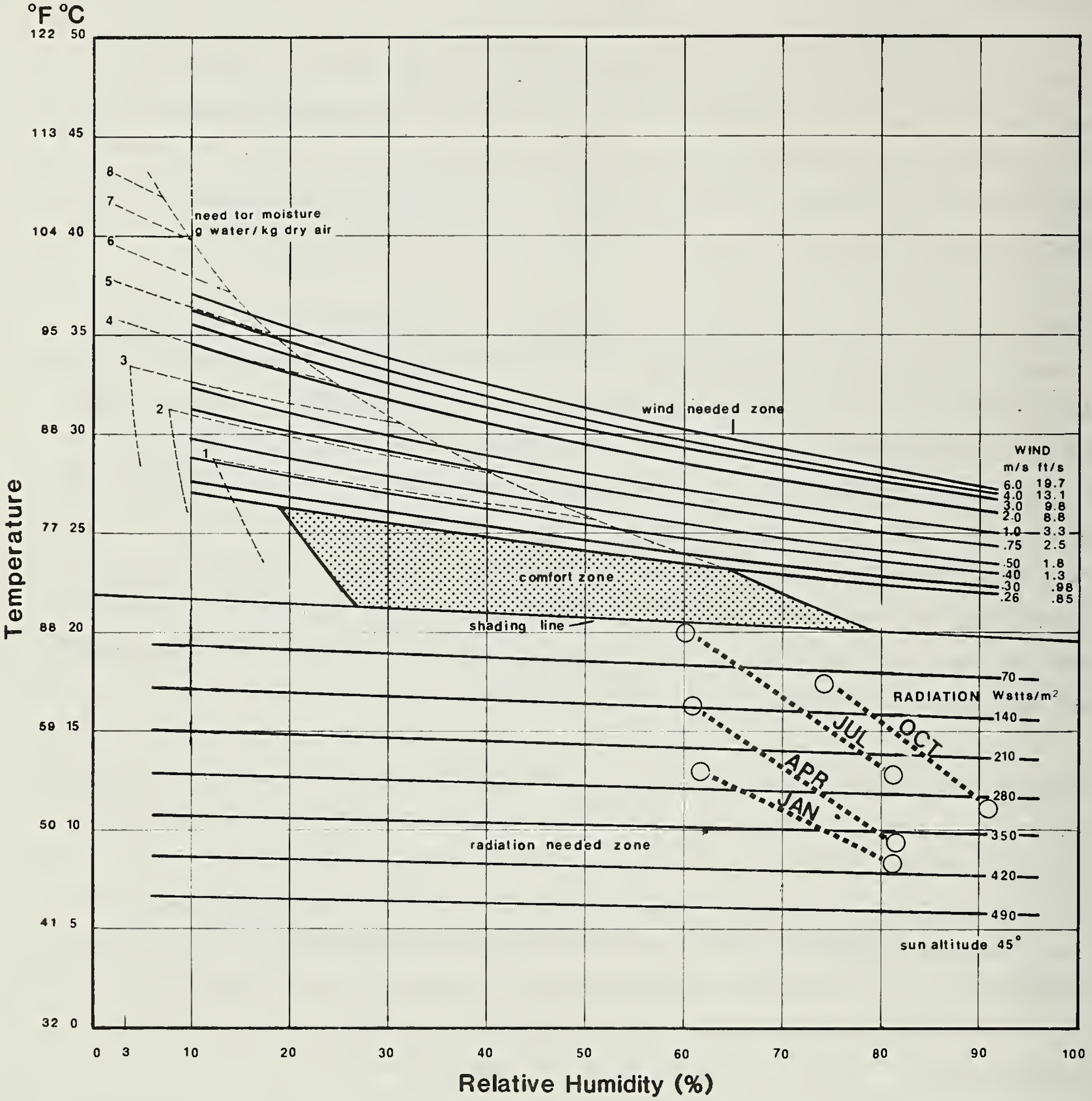
Pedestrian comfort can be adversely affected by mechanical effects of the wind (buffeting, raising dust, wind-driven rain) or by thermal imbalance (over-heating or over-cooling). In San Francisco, mechanical effects can sometimes cause discomfort during extremely windy conditions. Because of San Francisco's cool weather, however, thermal discomfort is more common, and occurs at much lower windspeeds.

Figure IV.H.5 is a comfort diagram for a typically-dressed San Francisco pedestrian. Known as a "bioclimatic chart," it shows a "comfort zone": combinations of temperature and humidity that result in thermal comfort (in the absence of wind or sunlight). Below this zone, radiation (sunshine) is needed to maintain thermal comfort. Above this zone, wind is needed to maintain thermal comfort. The daily variation of mean temperature and humidity in San Francisco at different times of the year is shown on the same figure. For a large part of the year, radiation is needed even when there is no wind. The effect of wind is to increase the amount of radiation needed to maintain comfort. The data shown in Figure IV.H.5 are for a person walking. Persons sitting generate less metabolic heat and therefore require higher levels of radiation.

Figure IV.H.5 indicates the importance of sunshine and shelter from the wind. Locations exposed to the wind and shaded by buildings are seldom comfortable in San Francisco's typically cool temperatures. Pedestrian areas need sunlight and/or shelter from the wind at all times of year to be consistently comfortable, except on the warmest days of the year. Because of San Francisco's moderate temperature range, sunny, wind-protected public space is more usable in all seasons than in other cities with more extreme climates.

Skyline Image

Figure IV.H.6 shows the skyline of the C-3 Use District as it appeared in November, 1982 from a viewpoint on Potrero Hill, south of the Downtown. The tallest and bulkiest buildings are generally concentrated in the Downtown Office District (Subarea 1). The Bank of America Headquarters building and the Transamerica Building are the tallest structures visible in the figure. Although the overall aspect of the Financial District is of tall, flat-topped, rectilinear office towers, a few older office buildings of more varied styles and scales are also apparent. The Hobart Building and the Standard Oil Building are



NOTE: This chart demonstrates the combinations of climatic factors (temperature, wind, sun and humidity) that produce a climatic "comfort zone" for a typically attired individual on "average" days in San Francisco when the sun is at an angle of 45°. The chart indicates that for such individuals at such times, sunlight is typically required for outdoor comfort.

KEY TO SYMBOLS:

°F degrees Fahrenheit
°C = degrees Centigrade
g = gram
kg = kilogram
m = meter
ft = feet

FIGURE IV.H.5:
BIOCLIMATIC CHART FOR SAN FRANCISCO

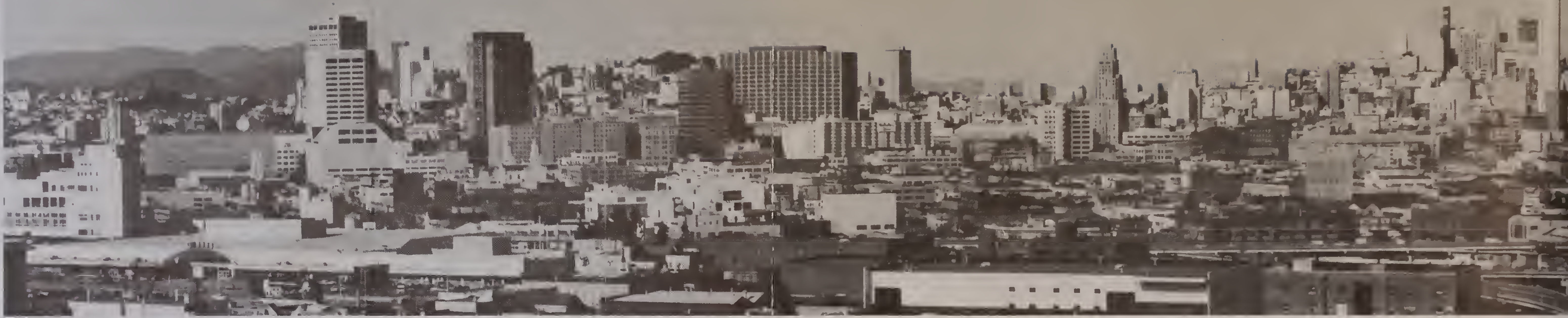
SOURCE: Donald Ballanti

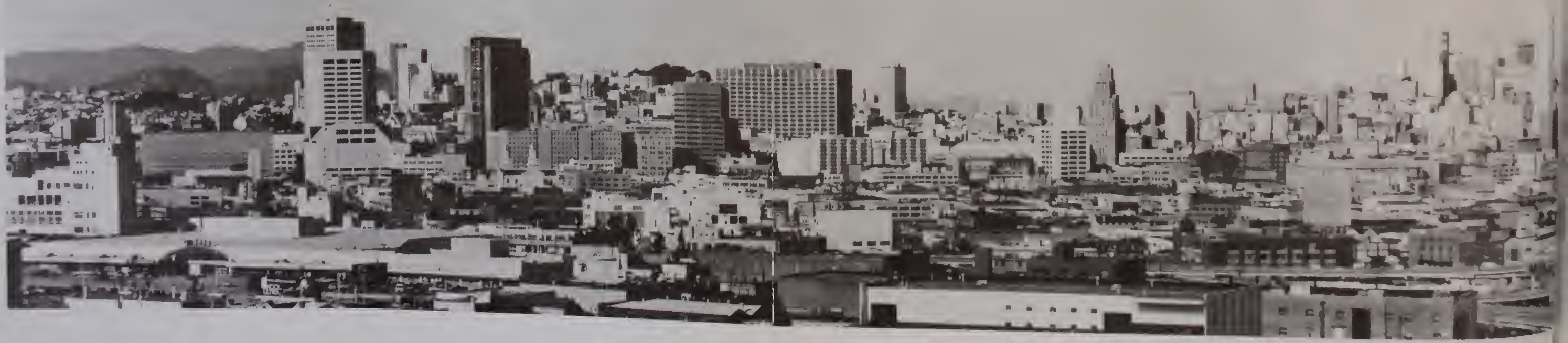
notable examples of older buildings that remain visible among the newer larger structures. The remaining spaces between buildings also impart visual interest and variety to the skyline.

Between the Central Office District and the Civic Center the rise of Nob Hill is apparent in the middle distance, particularly its western slope. Telegraph Hill, beyond the Financial District, is not visible in Figure IV.H.6, but other landmarks including the dome of City Hall, the Golden Gate Bridge, Pacific Heights and the hills of Marin County can be seen to the left. The East Bay can be seen in the distance to the right of the Financial District, but views of the Bay itself are blocked by existing office buildings.

Figure IV.H.7, shows the additional visual effect of buildings under construction in 1982 and scheduled for completion in 1984. Note that the completion of structures shown at the right of the figure will further reduce views to the Bay, East Bay and sky from the photo location, and that completion of the building at One Sansome Street in the central portion of the office district, would reduce sky visibility and the variation in the interface between the sky and downtown buildings.

A reference key to the skyline photos is shown in Figure IV.H.8, page IV.H.24.





NOTE: See Figure IV.H.8 for a reference key to selected existing buildings and buildings to be completed by 1984.

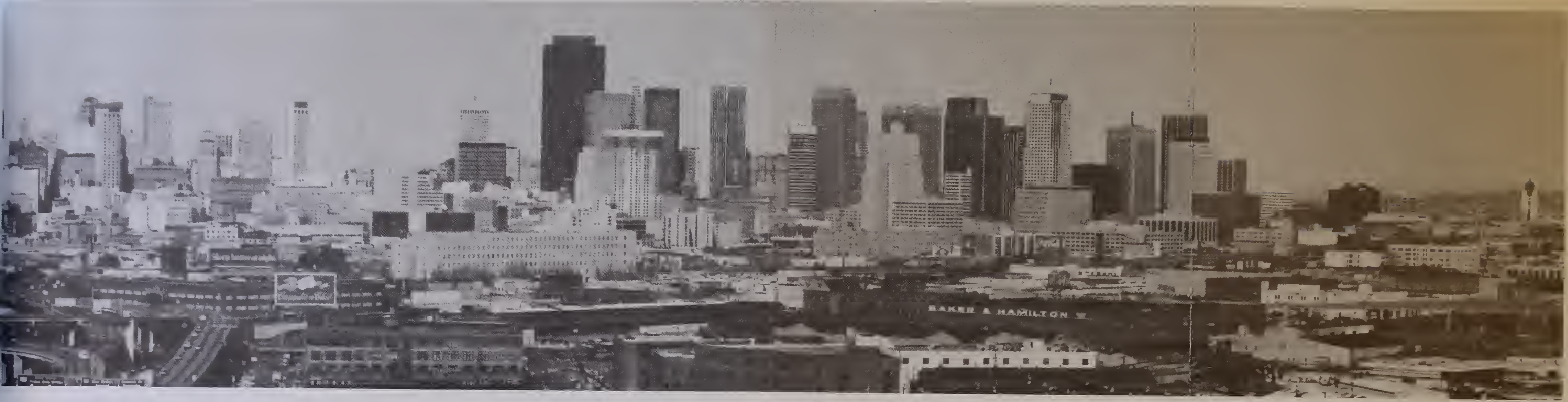


FIGURE IV.H.6:
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, 1982
SOURCE: Roger Owen Boyer and Associates

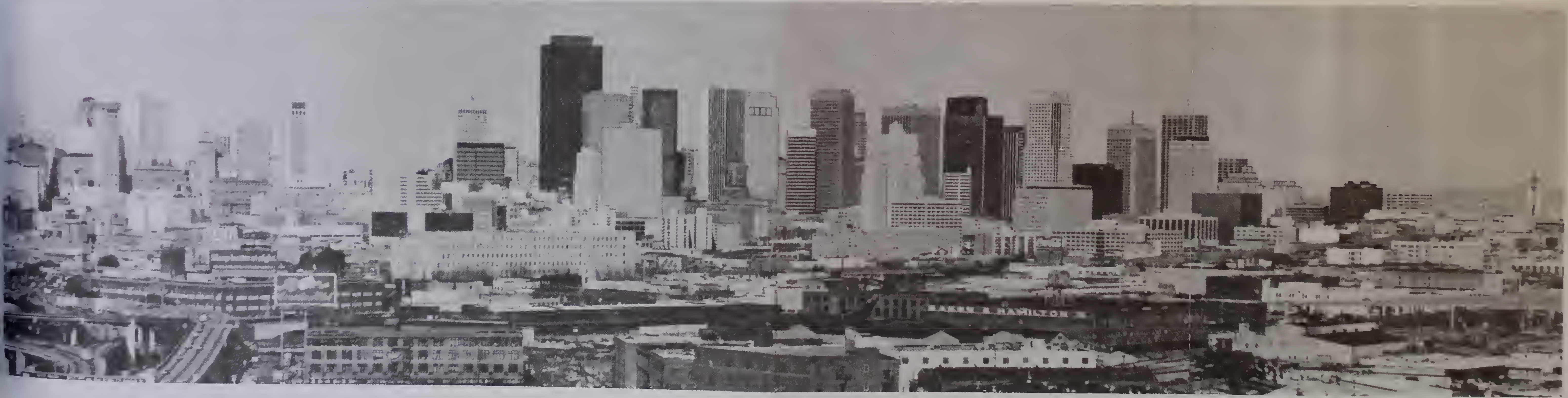
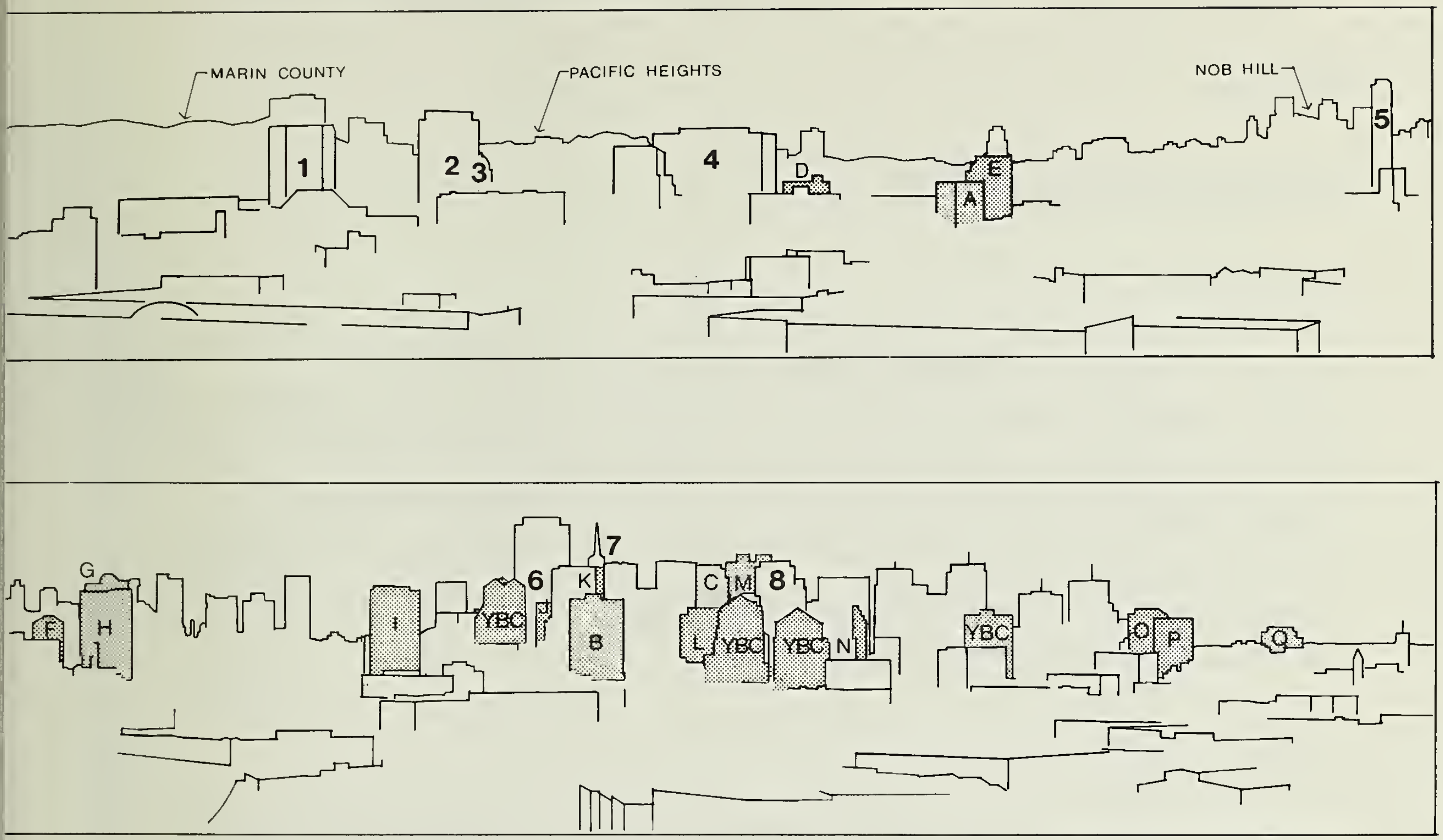


FIGURE IV.H.7:
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, 1984
SOURCE: Roger Owen Boyer and Associates



TE: See skyline photos, Figures IV.H.6, IV.H.7, IV.H.16, IV.H.17, and VII.20 through VII.24.

BUILDINGS APPEARING IN 1982 SKYLINE.

Bank of America Data Center

Fox Plaza

City Hall

Federal Building

Hilton Hotel

Bank of America Headquarters

Transamerica Building

Standard Oil Building

BUILDINGS UNDER CONSTRUCTION IN 1982 (1984 SETTING).

1155 Market Street

Meridian Hotel

One Sansome Street

BUILDINGS APPROVED AND BUILDINGS ON SITES IN REVIEW IN 1983 (1990 SETTING).

Holiday Inn Expansion

1151 Market Street

F. Olympic Club Hotel

G. Holiday Inn

H. Hotel Ramada

I. Pacific Apparel Mart

J. 154 Sutter/Kearny

K. 333 Bush Street

L. 90 New Montgomery Street

M. 333 California Street

N. One Anthony Place

O. 135 Main Street

P. 315 Howard Street

Q. 201 Spear Street

YBC Yerba Buena Center

FIGURE IV.H.8:
KEY TO BUILDINGS IN SKYLINE

SOURCE: Roger Owen Boyer and Associates

IMPACTS

Architectural/Historic Resources

Introduction

The loss of architectural/historic resources combined with high density development would qualitatively change perceptions of the historic character of the downtown. High density development would block short- and medium-range views of historic buildings. (Long-range views are already dominated by existing high-density development. In addition, loss of existing historic buildings could result in the loss of the remaining groupings of architectural/historic resources, and further fragment visual perceptions of the historic development pattern downtown.

1990

Projects proposed to be completed in or before 1990 would result in the loss/13/ of approximately 50 resource buildings in the C-3 district (see Tables IV.H.3 and IV.H.4). These buildings constitute four percent of the total 1,389 rated buildings in the district. The loss of this number of resources would represent a rate of about eight per year, similar to the rate of seven to nine per year that occured between 1979 and 1984. One of the 50 buildings is a City Landmark; 43 are located in the Downtown Office District (Subarea One). The 50 buildings proposed to be demolished or substantially altered include one Category I, no Category II, no Category III, and four Category IV buildings, for an overall loss of five buildings noted to be significant or contributory in the Downtown Plan. All five of these buildings noted in the Downtown Plan are in the downtown office district (Subarea One). Three rated buildings (351 California Street, 311 California Street, and 466 Bush Street) are under the same ownership as proposed adjacent developments and would be incorporated into the design of the new projects.

Two projects that are proposed to be built by 1990 include additional building floor area transferred from neighboring architectural/historic resources. The transfer of development rights (TDRs) or unused floor area, from architectural resources to other sites may provide a developer of a new project an additional building allowance./14/ The Mechanics Institute Library (85 Post Street) and the Hallidie Building (130 Sutter Street) are current examples of projects that are providing unused development rights to adjacent projects.

TABLE IV.H.3: C-3 DISTRICT ARCHITECTURAL RESOURCES SUSCEPTIBLE TO DEMOLITION OR SUBSTANTIAL ALTERATION BY 1990 AND 2000 UNDER THE DOWNTOWN PLAN

Study Area and Type of Resource (a)(c)	Total Resources in 1984	Total Proposed to be Lost by 1990	Total Forecast to Become Vulnerable Under the Downtown Plan, 1990 - 2000
Subarea 1			
Heritage A	47	0	0
Heritage B	84	10	1
Subtoal A + B (b)	131	10	1
Heritage C	188	33	14
Total A + B + C	319	43	15
National Register and/or City Landmarks (b)	17	1	0
Subareas 2-7			
Heritage A	83	0	0
Heritage B	212	2	6
Subtotal A + B (b)	295	2	6
Heritage C	775	5	18
Total A + B + C	1,070	7	24
National Register and/or City Landmarks (b)	14	0	0
C-3 Totals			
Heritage A	130	0	0
Heritage B	296	12	7
Subtotal A + B (b)	426	12	7
Heritage C	963	38	32
Total A + B + C	1,389	50	39
National Register and/or City Landmarks (b)	31	1	0

(a) See Appendix E for descriptions of ratings in this column.

(b) Totals for Heritage A and Heritage B buildings include National Register and/or City Landmark properties. The V.C. Morris Building is a National Register property, but is not rated by Heritage because it was completed after 1945. It is not included in the corresponding totals shown in this table.

(c) Study areas are based on existing C-3 District boundaries (see Figure II.1).

SOURCE: Roger Owen Boyer & Associates.

TABLE IV.H.4: PERCENTAGES OF C-3 DISTRICT ARCHITECTURAL RESOURCES SUSCEPTIBLE TO DEMOLITION OR SUBSTANTIAL ALTERATION BY 1990 AND 2000 UNDER THE DOWNTOWN PLAN

Study Area and Type of Resource (a)(c)	Total Resources in 1984	% 1984 Total Proposed to be Lost by 1990	% 1990 Resources Forecast to Become Vulnerable Under the Downtown Plan, 1990 - 2000
Subarea 1			
Heritage A	47	0	0
Heritage B	84	12	1
Subtoal A + B (b)	131	8	1
Heritage C	188	18	9
Total A + B + C	319	14	5
National Register and/or City Landmarks (b)	17	6	0
Subareas 2-7			
Heritage A	83	0	0
Heritage B	212	1	3
Subtotal A + B (b)	295	1	2
Heritage C	775	1	2
Total A + B + C	1,070	1	2
National Register and/or City Landmarks (b)	14	0	0
C-3 Totals			
Heritage A	130	0	0
Heritage B	296	4	2
Subtotal A + B (b)	426	3	2
Heritage C	963	4	3
Total A + B + C	1,389	4	3
National Register and/or City Landmarks (b)	31	3	0

(a) See Appendix E for descriptions of ratings in this column.

(b) Totals for Heritage A and Heritage B buildings include National Register and/or City Landmark properties. The V.C. Morris Building is a National Register property, but is not rated by Heritage because it was completed after 1945. It is not included in the corresponding totals shown in this table.

(c) Study areas are based on existing C-3 District boundaries (see Figure II.1).

SOURCE: Roger Owen Boyer & Associates.

2000

Introduction. The emphasis in this section is upon presenting the numbers of architectural/historic resources that are forecast to be threatened (and, conversely, preserved) by the policies of the Downtown Plan. The two principal features of the Plan that would protect architectural/historic resources are its program of transferable development rights (TDR), which is described in Section III, and the prohibition upon demolition of Category I and II buildings. Because the proposed TDR program is an integral component of the land use and development analysis, its potential effects upon future downtown development patterns, and the reasons for those effects, are discussed in detail in the appropriate Land Use and Real Estate Development sections of this EIR, Section IV.B (at about pages IV.B.65 and IV.B.72) and Appendix G (at about pages G.5 and G.8). The reader is referred to these sections for further discussion of TDR.

Impacts. Generally, the sites within the C-3 District that would be most susceptible to development after 1990 under the Downtown Plan are those for which the difference between the existing level of development and the potential level of development under the Plan would be greatest.

The estimates of architectural/historic resources susceptible to loss as a consequence of new development was prepared using a methodology similar to that described for the estimates of uses demolished in the course of new development. For the 1981 to 1984 and 1984 to 1990 periods, the estimates of vulnerable architectural/historic resources reflect the conditions of the sites on which projects are under construction or are proposed to be developed. For the 1990 to 2000 period, the ranking of potential development sites generated by the real estate forecasting methodology (see Appendix G) provided a guide to estimating the magnitude and locational distribution of resources that would be vulnerable to redevelopment as a consequence of new development. The real estate forecasting methodology was not designed to yield accurate predictions of C-3 District development on a parcel-by-parcel basis. Consequently, the estimates of vulnerable resources are presented primarily to indicate the effect of the Downtown Plan upon the number of resources threatened. They cannot be interpreted as predicting which individual buildings would be demolished.

Under the Downtown Plan, approximately 39 rated architectural/historic resources are on sites projected to become vulnerable to development between 1990 and 2000. Loss of the resources on these sites would represent a loss of three percent of the resources projected to exist in 1990. The 39 buildings include no Category I, one Category II, three Category III, and four Category IV buildings as categorized in the Downtown Plan. The potentially vulnerable Category II building would be required to be preserved in a manner consistent with the protective provisions of the Plan. Of the 39 buildings, none would be rated A by Heritage, but nine would be rated B. The greatest numbers of vulnerable architectural/historic resources would be concentrated in the Downtown Office District (38% of the total of 39). This is indicated by the land use and real estate development forecasts (see Section IV.B), which predict that the bulk of new office construction will be in the Downtown Office District, and by the fact that this district contains the highest concentration of architectural resources in the C-3 District.

Streetscape and Pedestrian Amenities

Introduction

Recent development in the C-3 District has generally tended to increase the degree of street enclosure and the intensity of street activity, especially in the Central Office District. While the streetscape continues to be the focus for urban activity, continued new development heightens issues of the quality of change in the City's street environment. Congestion, loss of sunlight, increased wind levels, demolition of architectural resources, inadequate provision for pedestrian open space and amenities, and mediocre architectural design are common concerns related to the streetscape. The impact of building development on the streetscape depends largely on the scale and form of building design and the limitations, requirements and incentives of zoning regulations and City policy.

1990

The 1990 streetscape in the C-3 district is expected to be similar to the streetscape that exists in 1984, except for changes due to the completion of buildings under construction and approved in 1984, completion of buildings that comply with the Downtown Plan on sites for which projects had been proposed in December 1983, and commencement of construction of projects to be completed after 1990.

The effects of individual projects that are under construction, or have been approved, upon streetscape and pedestrian amenity are addressed in their respective project EIRs. The cumulative effects of these projects, projects on sites that were proposed for development in 1983 and that comply with the Downtown Plan, and future projects that could be built on sites not proposed for development in 1983 and that comply with the Downtown Plan, are discussed below.

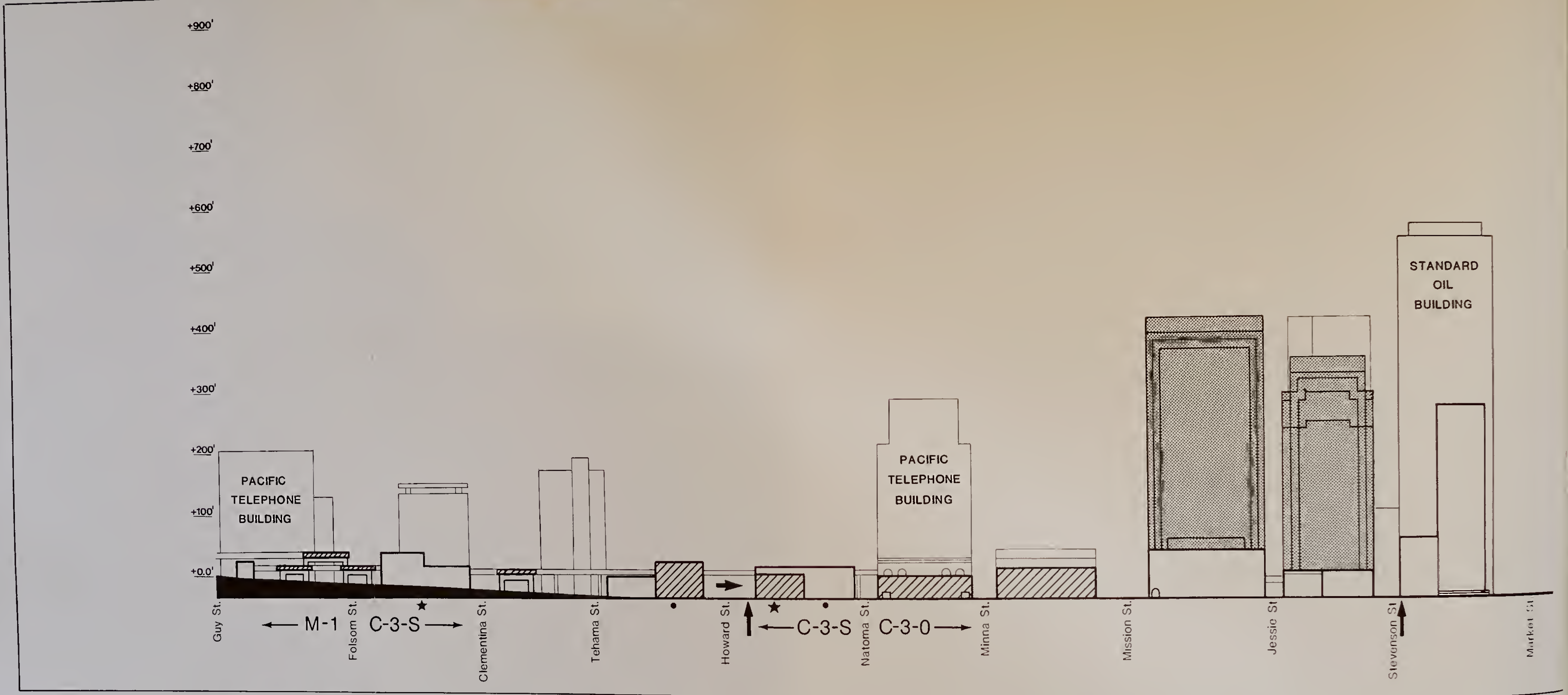
The effects of development forecast to occur by 1990 along the Sansome and Ecker Streets cross-section are depicted in Figure IV.H.9.

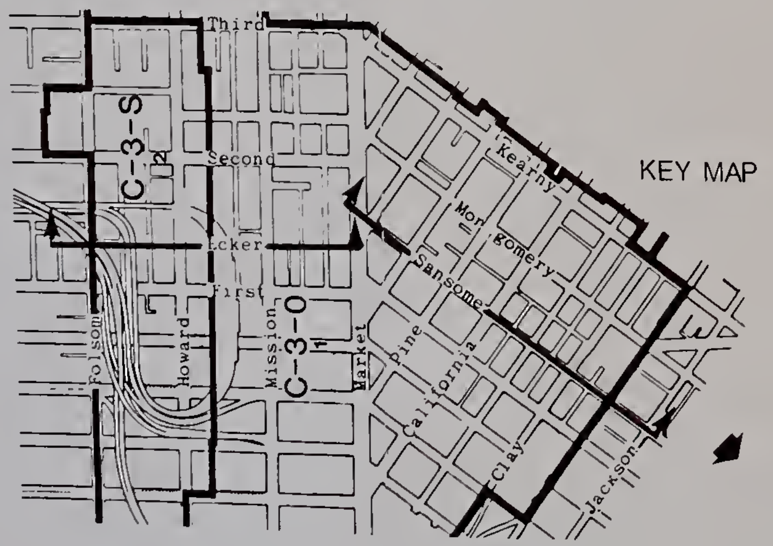
2000

Using projections for the quantity of development forecast in the Land Use and Real Estate Development analysis (see Section IV.B), potential building designs for several sites of opportunity along Sansome and Ecker Streets were developed. These designs are illustrated in Figure IV.H.10, which is based upon the preceding similar figure for 1990, Figure IV.H.9. The two figures also show the period in which the buildings are forecast to be built, as represented by gray tones, the darker representing 1990 to 2000, the lighter, 1984 to 1990.

The vertical arrows at four case study locations indicate photo locations for the fisheye photos used in the sunpath analyses described below in Wind, Sun and Shadow (see Figures IV.H.12-15, pp. IV.H.39-42). Horizontal arrows at two of the same locations indicate street-level view points for the illustrations of streetscape views shown in Figures IV.H.3, p. IV.H.11; IV.H.4, p. IV.H.13; IV.H.11, p. IV.H.33; and VII.13-19. These street level views, combined with the cross-section diagrams, illustrate typical impacts of the Downtown Plan on the street environment. For the purposes of the 1990-2000 analysis, existing buildings are assumed to be demolished on the case study sites of opportunity and new buildings constructed in their place where this would be permitted under the provisions of the Downtown Plan. These sites were selected for their apparent economic developability although no plans for the redevelopment of the sites were known by the authors to exist at the time of writing.

The buildings shown in the street views and the cross-sections are designed in accordance with the provisions of the Downtown Plan. The principal additional design assumptions underlying each design are that the developer will build the maximum square footage that





ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

▨ BUILDING IN SECTION

▭ BUILDING AT STREET FRONTAGE

▭ BUILDING AT DEPTH OF UP TO ONE BLOCK

▭ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

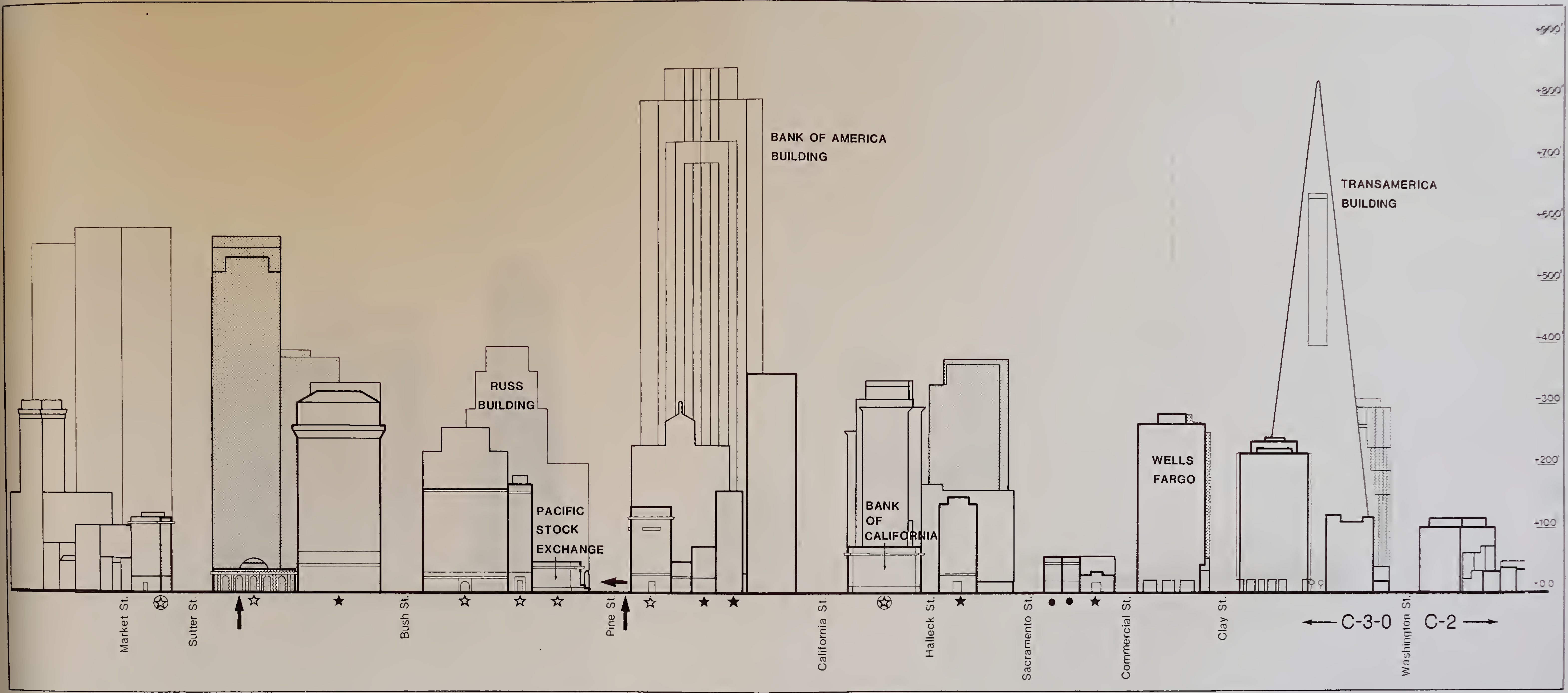
ARCHITECTURAL RESOURCES

✪ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

• HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

☐ BEFORE 1983

☐ 1983-1984

▨ 1985-1990

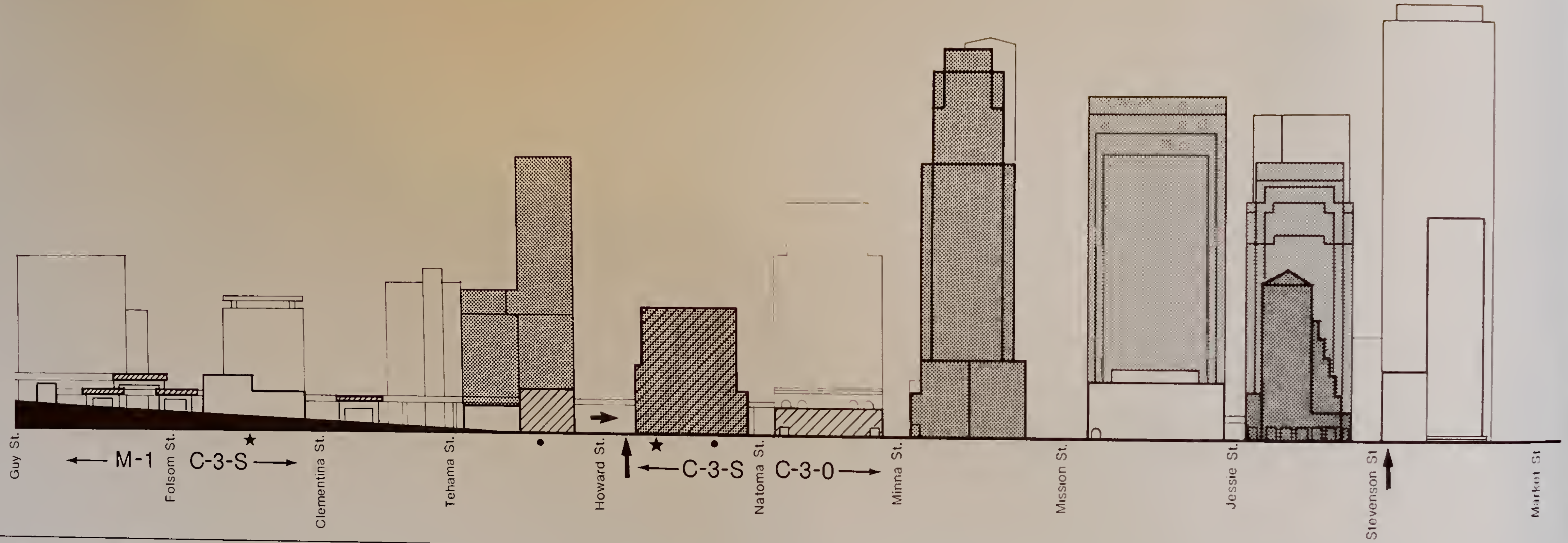
PHOTO LOCATIONS

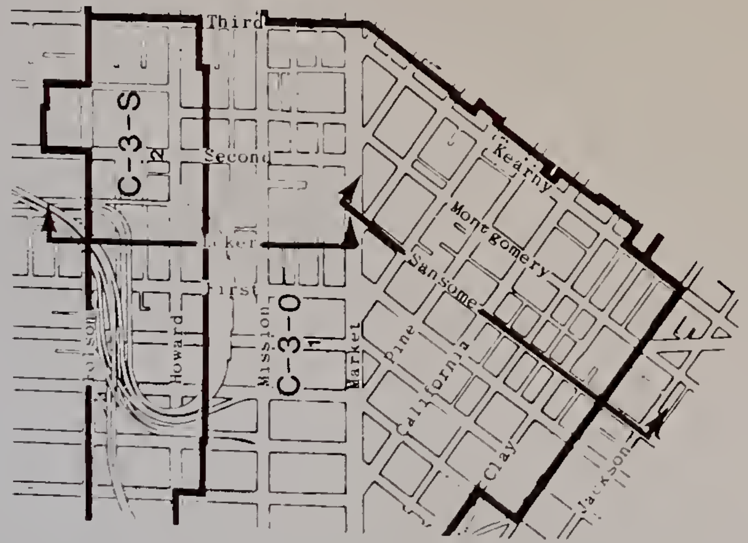
→ LOCATION OF STREET-LEVEL PHOTO
(See Figures IV.H.3, IV.H.4, IV.H.11 and VII.13 - VII.19)

↑ LOCATION OF FISHEYE PHOTO
(See Figures IV.H.12 - IV.H.15)

FIGURE IV.H.9:
C-3 DISTRICT STREETSCAPE, 1990

SOURCE: Roger Owen Boyer and Associates





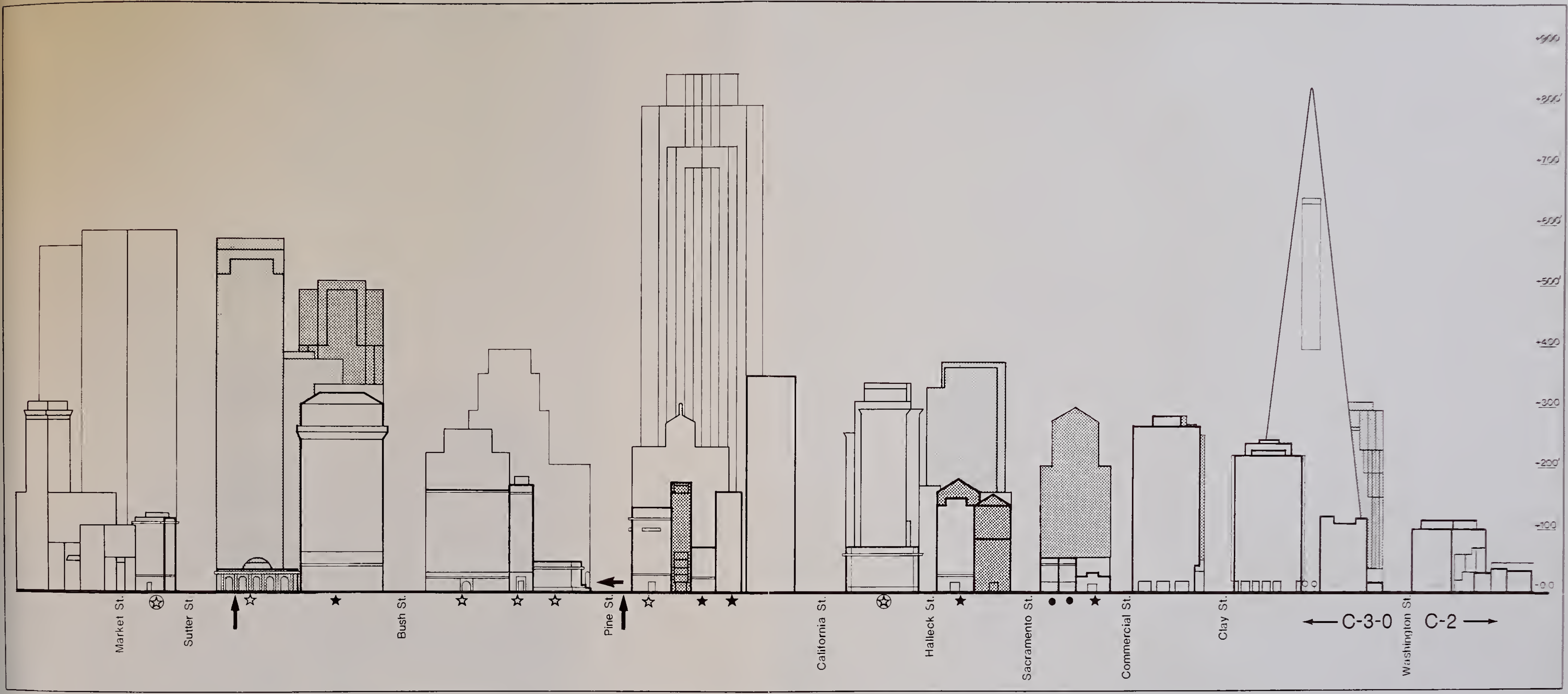
ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

- ▨ BUILDING IN SECTION
- ☐ BUILDING AT STREET FRONTAGE
- ☐ BUILDING AT DEPTH OF UP TO ONE BLOCK
- ☐ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

ARCHITECTURAL RESOURCES

- ✪ CITY LANDMARK
- ☆ HERITAGE A
- ★ HERITAGE B
- ● HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

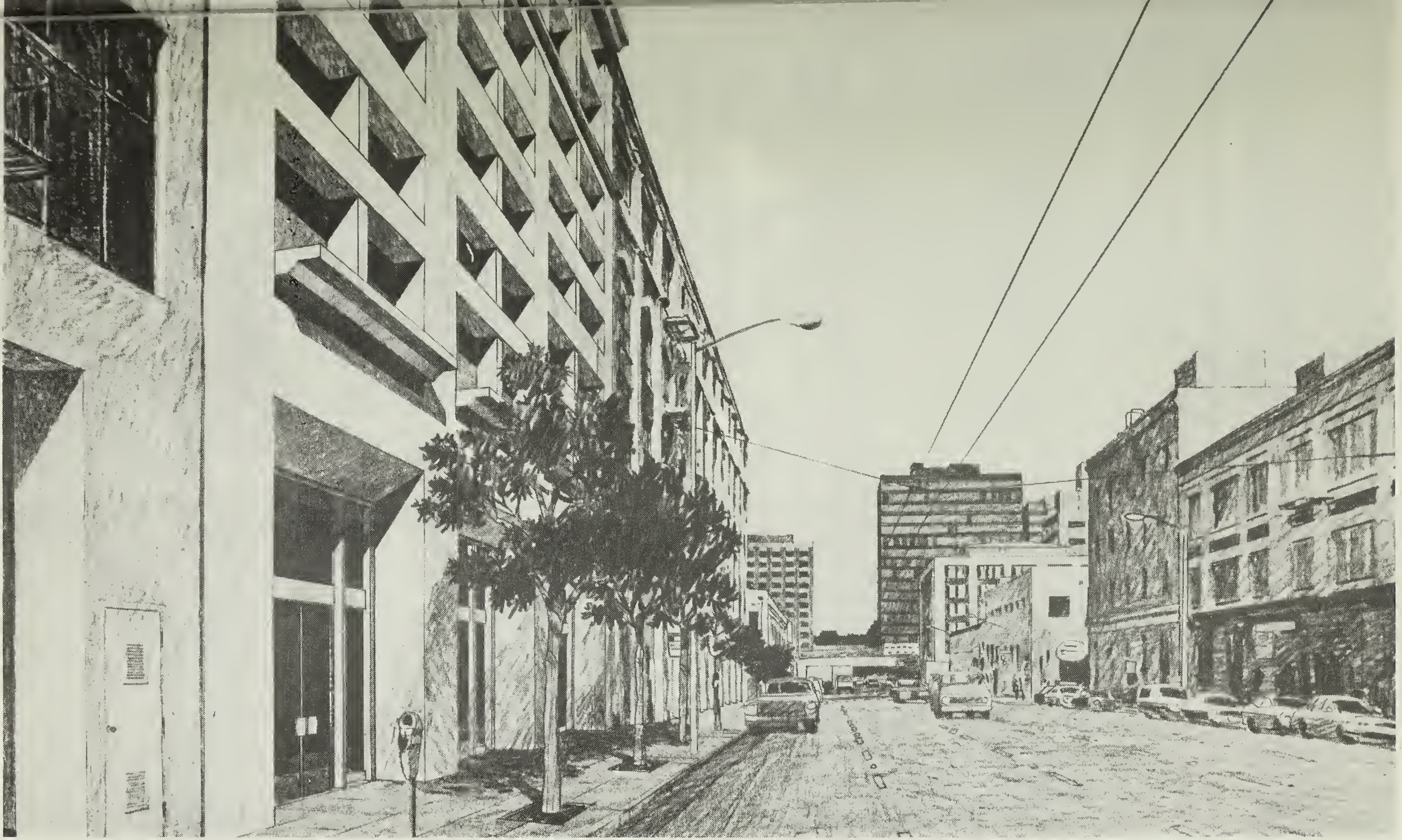
- ☐ BEFORE 1983
- ☐ 1983-1984
- ░ 1985-1990
- ▒ 1991-2000

PHOTO LOCATIONS

- ➔ LOCATION OF STREET-LEVEL PHOTO
  (See Figures IV.H.3, IV.H.4, IV.H.11 and VII.13 - VII.19)
- ↑ LOCATION OF FISHEYE PHOTO
  (See Figures IV.H.12 - IV.H.15)

FIGURE IV.H.10:
C-3 DISTRICT STREETSCAPE,
DOWNTOWN PLAN, 2000

SOURCE: Roger Owen Boyer and Associates



NOTE: See Table IV.H.5 for design requirements, bonuses and options incorporated in case study design.

FIGURE IV.H.11:
522/528 HOWARD STREET, DOWNTOWN PLAN, 2000

SOURCE: Roger Owen Boyer and Associates

is economically feasible, and that the developer will build the fewest number of floors feasible in achieving the optimum square footage. These assumptions are established for economic reasons that are typical of new development, particularily office buildings. The layouts of buildings shown are also based on the building designs developed in the construction feasibility analysis described in Appendix D. The regulations and bonuses used in the designs for the two case study sites are shown in Table IV.H.5, page IV.H.35. The cross-sections and street views illustrate possibilities for design solutions using these criteria. The degree of compliance required by the Downtown Plan with the Master Plan Policies and related amenity criteria is assessed in Table IV.H.6, page IV.H.36.

Wind, Sun and Shadow

A quantitative analysis of wind and sunlight effects resulting from the adoption of the Downtown Plan is complicated by the site-specific nature of wind and sunlight changes. Long-term development would result in a discrete number of new buildings whose exact locations and designs cannot be predicted with certainty. As the wind and sunlight impacts of each building would depend on variables such as building orientation, shape, bulk, profile and other design features, a qualitative analytical approach is taken here.

Wind

Past wind-tunnel tests of scale models of proposed buildings provide a data base from which to develop relationships between wind effects and building characteristics. Between 1974 and 1982, 53 proposed buildings of varying size, height, and shape were tested using the same methodology to predict the extent and severity of wind accelerations at ground level. The analysis of these data is described in Appendix L.

The variation in ground level wind impacts for the buildings tested was found to be related to three factors:

- exposure of the building to the prevailing wind direction,
- the extent and uniformity of the windward facade, and,
- the location of the site on the block.

TABLE IV.H.5: REQUIREMENTS, BONUSES AND OPTIONS USED IN BUILDING DESIGNS FOR DOWNTOWN PLAN CASE STUDY SITES

Case Study Site Location: Sansome and Pine Streets; C-3-0 Use District (See Figure IV.H.3)	Case Study Site Location: Howard Street, Mid-500 Block; C-3-S Use District (See Figures IV.H.4 and IV.H.11)
The existing building would be a Category I building; demolition would be prohibited.	The existing one-story building would be demolished. It is a Category III structure with a DCP rating of 3.
	* Floor Area Ratio (FAR): 6 to 1, plus TDR * Height and Bulk Limits: 450-S * 1st Floor retail use * Bulk Controls, see Chart A, Figure III.3. * Tower Separation, see Chart C, Figure III.3. o Cornices o Decorative Projections * Building Setbacks, see Table 9, p. 96, Plan * Sun Access Angles, see Table 12, p. 100, Plan o Recessed Windows o Harmony with existing buildings * Setback Dimensions, see Chart D, p. 106, Plan o Street trees + Transfer Development Rights * Open space located elsewhere

NOTES:

The format of Table IV.H.5 is designed to be consistent with the format of its companion table, Table VII.H.3, which compares similar design criteria of the Alternatives.

* Denotes a requirement.
+ Denotes an option for which a floor area bonus is allowed.
x Denotes a building feature allowed.
o Denotes a building feature encouraged as necessary for consistency with neighboring buildings.

SOURCE: Roger Owen Boyer and Associates

TABLE IV.H.6: PROVISIONS OF DOWNTOWN PLAN RELATED TO STREETSCAPE AND PEDESTRIAN AMENITY

Urban Design Plan Objectives(a,b) and Related Streetscape and Pedestrian Amenities	Downtown Plan(c)
- Provide Transition between New Large Buildings and Existing Smaller Buildings	P
- Discourage Accumulation of Large Properties	N
- Provide for Open Space and Landscaped Areas for Pedestrians	M
- Promote Large-Scale Landscaped Areas and Open Space	P
- Provide Street Trees	P
- Provide Landscaping to Screen Residential Areas from Commercial and Industrial Areas	N
- Provide Windbreaks, Other Design Measures to Reduce Wind	M
- Landscape Parking Areas for Protection of Pedestrian Areas	N
- Limit Garage Entrances Along Sidewalks	P
- Provide Retail and Commercial Facilities along Street	P
- Provide a Sense of Place with Shade, Shelter, Amenities and Conveniences	M
- Provide Landscape Furniture, Floorscape, Posts, Canopies, Enclaves, Focal Points, Enclosures	P
- Encourage Quality of Detail	P
- Provide Alternate Routes of Pedestrian Travel which Create Enclosure and a Variety of Spatial Experience	P
- Preserve Continuous Downtown Street Facades	M
- Provide Continuity of Existing Cornice and Parapet Lines	M
- Provide Richly Detailed Facades	P
- Limit Blank Walls at Street Level	P(d)
- Limit Blank Walls at Second and Third Floors	P(d)
- Provide Pedestrian Scale along Street by use of Arcades, Horizontal Divisions, etc.	P
- Provide Arcades for Covered Access to Buildings	N
- Require Sunlight in Building Plaza	M
- Locate Buildings so as not to Block Distant Views from Street	P
- Provide Planting and Paving in Alleys to Create a Commercial Promenade	P
- Protect Alleys in Residential Areas as Children Play Areas	N
- Provide Mid-Block Pedestrian Shortcuts through Buildings	P(d)
- Provide Dignified Signs on Commercial Buildings	N
- Protect Unique and Extraordinary Areas and Features of San Francisco	M
- Protect Adjacent Parks or Plazas from Building Shadows	M
- Design Buildings to Reflect Character of Adjacent Architectural Resources	P
- Provide Space for Shoppers, Groups, Vendors, Etc.	M
- Protect sun access of lunchtime malls	P
- Modify building forms to reduce local wind currents	M
- Require investment in artwork	M

NOTES:

The format of Table IV.H.6 is designed to be consistent with the format of its companion table, Table VII.H.3, which compares similar criteria of the Alternatives.

(a) Master Plan Policies are listed in Section III and in The Comprehensive Plan of the City and County of San Francisco, The Urban Design Plan, August 26, 1971, adopted by Resolution No. 6745 of the City Planning Commission.
(b) Streetscape and Pedestrian Amenities are summarized and abstracted from Townscape, by Gordon Cullen, 1961, and from Design of Cities, by Edmund N. Bacon, 1967.
(c) M - Provision of amenity is mandatory
P - Provides guidelines and encourages amenities
N - No provision for this amenity

(d) Provision of amenity is mandatory in specific locations

SOURCE: Roger Owen Boyer and Associates

The exposure of a building is simply the amount of the building that extends above upwind buildings. The more exposed a building is, the greater the volume and momentum of the wind intercepted, and the greater the potential for wind accelerations at street level.

The shape, area and uniformity of the upwind facade is another factor that determines pressure forces and wind accelerations near a building. All else being equal, the greater the area of the facade, the greater the typical wind accelerations at street level. Relatively large, uniform facades typically result in greater wind accelerations than do narrow or complex facades with numerous setbacks.

The location of a building within its block has little effect on the magnitude of wind accelerations, but does determine where accelerations occur. Because a highrise structure causes wind accelerations along its upwind facade and near its upwind corners, a building on the upwind side of the block has the greatest potential for causing wind accelerations in pedestrian areas. Conversely, a building located on the downwind side of a block has the least potential for pedestrian impacts because wind accelerations occur within the block and over the rooftops of surrounding buildings.

1990 Impacts. Impacts of individual buildings built before 1990 would be similar to those for buildings undergoing environmental review and wind tunnel testing in the period 1974-1982. The majority of these buildings were predicted to cause local wind increases at ground level (see Appendix L). None of the buildings tested, however, was predicted to cause wind accelerations of the magnitude associated with notably windy buildings in San Francisco such as Fox Plaza and the Federal Building.

The overall effect of development between 1984 and 1990 would be to increase the number of pedestrian areas affected by building-generated wind accelerations. About 60 percent of the space proposed to be constructed in the C-3 District in this period would occur in the Central Office District (Subarea 1), but the density and height of the many newer existing buildings would tend to reduce the exposure of new buildings to winds.

While growth in other subareas would be less, the lower general level of existing development maximizes the exposure of new buildings to the prevailing winds. The severity of wind impacts from individual new buildings is therefore potentially higher than in Subarea 1, although a lesser area would be affected.

2000 Impacts. Between 1990 and 2000, building designs and locations would be affected by the Downtown Plan. Wind impacts would continue to depend on the siting, massing and height of individual buildings but, in general, ground-level wind impacts would be reduced compared to those due to buildings constructed under Planning Code controls (the No Project Alternative). Adoption of the Plan would result in generally smaller structures that would be less exposed to winds. Bulk regulations would encourage tapered buildings with multiple setbacks and would discourage buildings with the uniform, continuous facades often associated with strong building-induced winds. The Downtown Plan calls for continuing the practice of wind tunnel testing of proposed designs and suggests that as a general rule, a building form which creates wind speeds in excess of eight miles an hour in pedestrian activity areas should not be used./15/

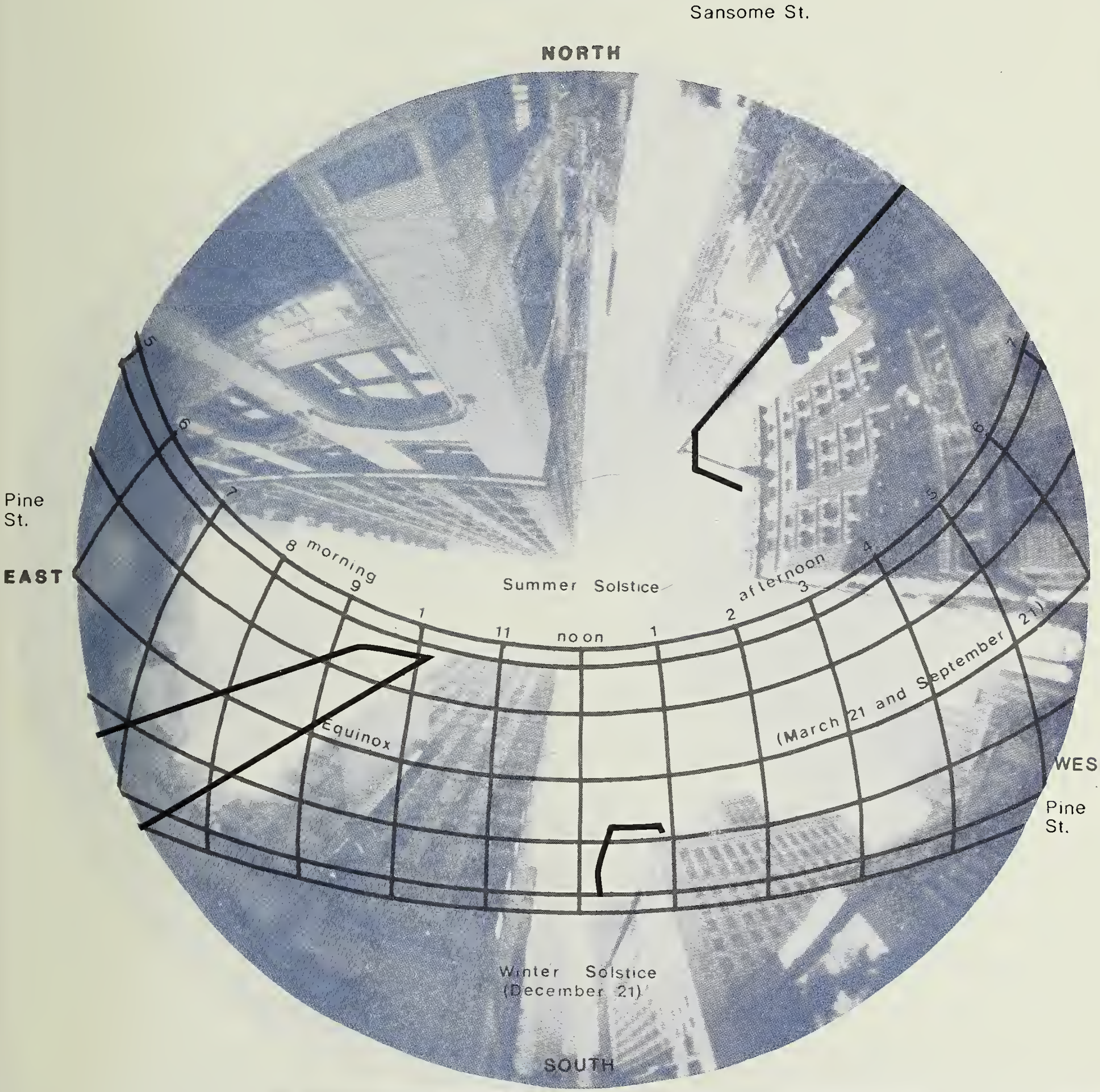
The Open Space chapter of the Plan also contains guidelines for wind protection within the required open space to be provided within or near downtown development.

Sun and Shade

The sun and shade impacts of a given structure are simpler to analyze than wind impacts, as the reduction of direct sunlight is totally determined by geometry. Nevertheless, impacts are site-specific and based on variables such as height, shape, bulk and orientation. Location on the block is important in assessing sun and shade impacts, as are nearby structures and the proximity of sun-sensitive activities and facilities such as plazas and parks. The orientation and width of streets is also a relevant factor.

1990 Impacts. Sunlight extent and duration at pedestrian levels would continue to be reduced by development proposed to be completed by 1990. Changes in Subarea 1 would be subtle, because sunlight is already restricted by existing buildings. The localized impacts of individual buildings in other subareas could be relatively greater because of generally lower existing buildings heights.

Of the case-study locations selected for detailed analysis (see Figures IV.H.12 to IV.H.15), only the 525 Market Street Plaza location shown in Figure IV.H.14 would be affected by construction between 1984 and 1990. Sunlight duration would be reduced by one and one-half to two hours daily in the fall and winter months at this location. A second proposed highrise in the area would have no additional effect.



TES:

See Figure IV.H.2 for location of photo

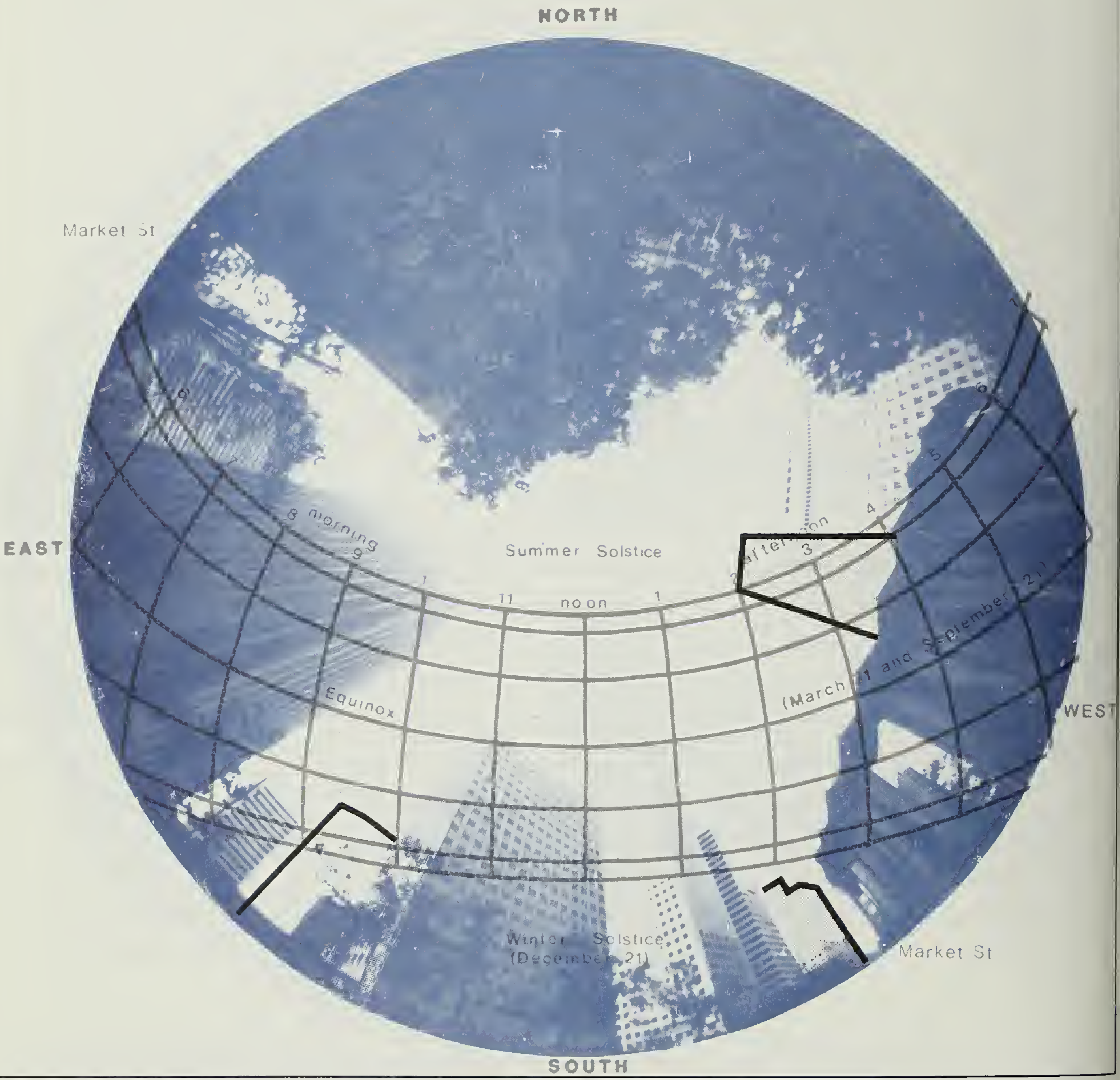
Buildings to be completed before 1990 are shown in black outline with gray infill.

uildings that could be completed 1990-2000 nder the Downtown Plan, are shown in black outline only.

FIGURE IV.H.12:

SUN PATH ANALYSIS, PINE STREET/ SANSOME STREET INTERSECTION, DOWNTOWN PLAN, 2000

SOURCE: Donald Ballanti



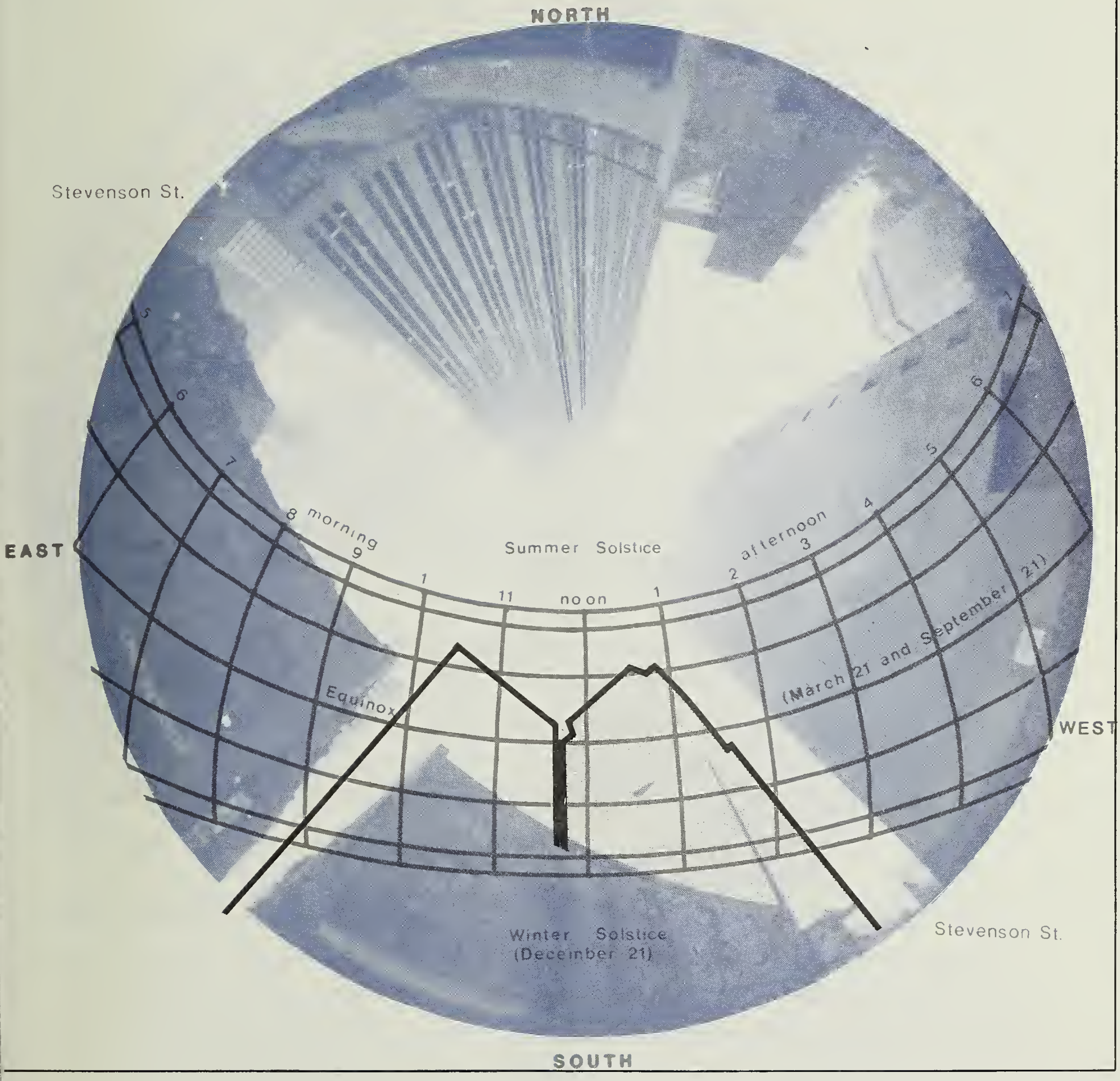
NOTES:

- See Figure IV.H.2 for location of photo
- Buildings to be completed before 1990 are shown in black outline with gray infill.
- Buildings that could be completed 1990-2000 under the Downtown Plan, are shown in black outline only.

FIGURE IV.H.13:

SUN PATH ANALYSIS
CROWN ZELLERBACH PLAZA
DOWNTOWN PLAN, 2000

SOURCE: Donald Ballanti



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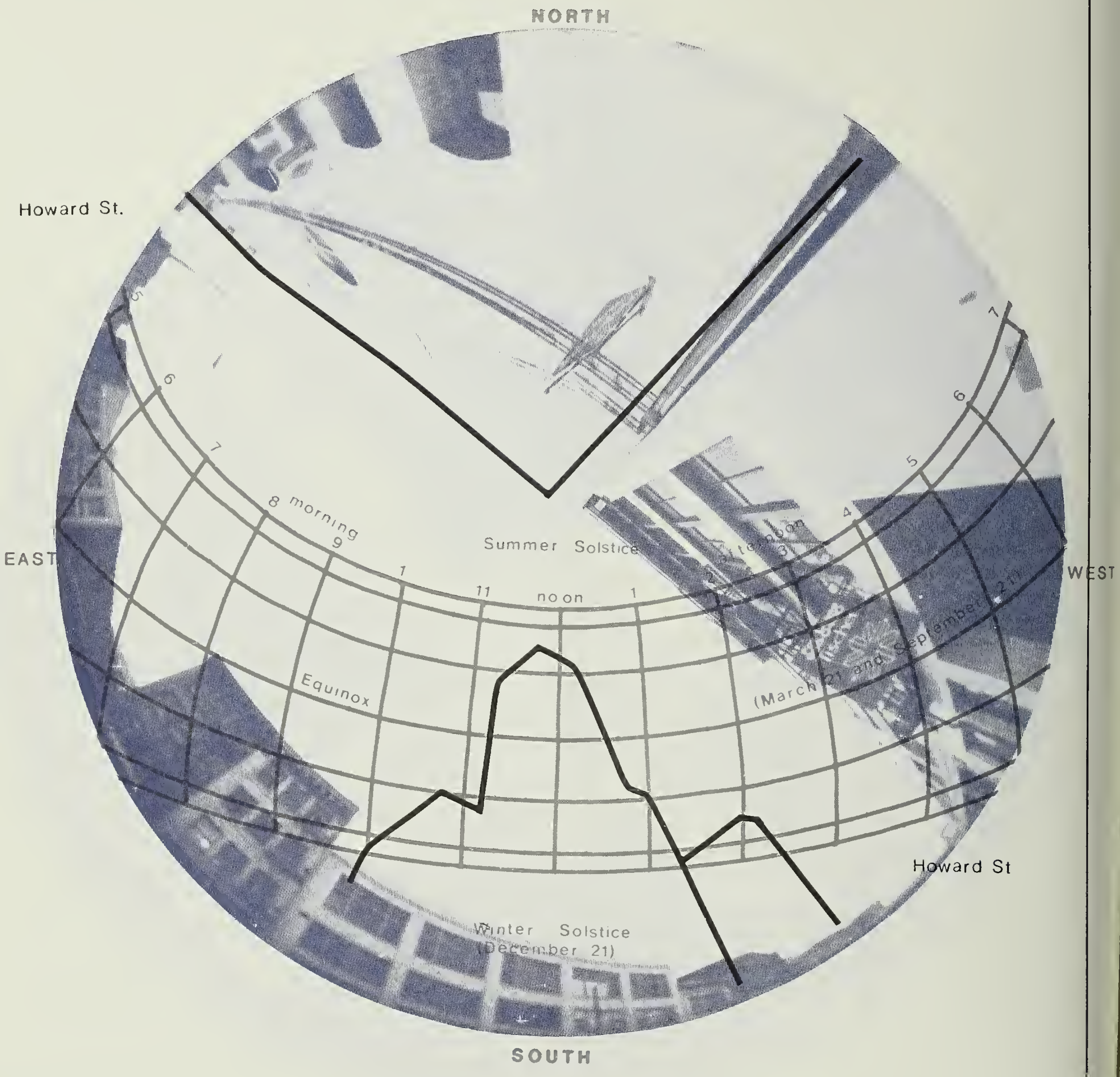
uildings that could be completed 1990-2000
der the Downtown Plan, are shown in black
tline only.

FIGURE IV.H.14:

SUN PATH ANALYSIS, 525 MARKET STREET PLAZA, DOWNTOWN PLAN, 2000

SOURCE: Donald Ballanti



NOTES:

- See Figure IV.H.2 for location of photo
- Buildings to be completed before 1990 are shown in black outline with gray infill.
- Buildings that could be completed 1990-2000 under the Downtown Plan, are shown in black outline only.

FIGURE IV.H.15:

SUN PATH ANALYSIS, 522/528 HOWARD STREET, DOWNTOWN PLAN, 2000

SOURCE: Donald Ballanti

2000 Impacts. Construction under the Downtown Plan between 1990 and 2000 would reduce sunlight reaching the ground throughout the study area, but the extent and severity of this reduction would vary by location. The Plan contains several policies to protect sunlight including the following:

- height zoning at 10 selected locations to protect sunlight access to open spaces,
- sun access criteria for selected public sidewalks,
- sunlight guidelines for required new open space, and
- building setbacks along selected streets.

The effect of these policies, if enforced, would be to limit future reductions in sunlight at important pedestrian areas in downtown San Francisco.

In areas not covered by sunlight protection policies, reductions in sunlight would generally continue as they did during the period 1984-1990. In Subarea 2, however, the increased height limits and transfer of development rights (TDR) provisions of the Plan would accelerate reductions in sunlight in unprotected areas. The areas of potential conflict between height zoning and sunlight access provisions in the South of Market area, and elsewhere in the downtown area, are shown in Map 15 in the Plan.

At all four case-study locations selected for detailed analysis, construction between 1990 and 2000 would reduce sunlight at street level, but the severities of the reductions would vary. At the Pine Street/Sansome Street intersection (Figure IV.H.12) sunlight duration would be reduced by about one hour in the morning most of the year. At the Crown Zellerbach Plaza (Figure IV.H.13), sunlight duration would be reduced by less than an hour for about one month in winter.

Sunlight reductions South of Market would be greater. At the 525 Market Street Plaza (Figure IV.H.14) development would reduce sunlight to less than one hour a day except in the late spring and early summer. At the 522/528 Howard Street location (Figure IV.H.15) sunlight reduction would be as much as three hours in winter, but there would be several hours of sunlight in the spring and summer months.

Skyline Image

Introduction

The San Francisco Urban Design Plan recognizes that "views contribute immeasurably to the quality of the city and to the lives of its residents."/16/ Several distinct visual impacts may be identified from an examination of the downtown skyline:

- Groups of office towers with flat tops and approximately the same heights produce a "benching" effect that reduces or eliminates variety and interest in the interface between sky and buildings and in the visual profile of individual buildings.

- Similary, concentrations of buildings with square tops and relatively large bulks at upper levels tend to produce a monotonous skyline. Such groups of buildings tend to block sightlines through the groups of buildings resulting in forshortened depths of views, reduced variety of elements in the views, diminished distinctiveness of individual buildings in the views, and, in general, reduced visual variety, richness and interest in the skyline scene.

- Increased concentrations of highrise structures tend to reduce the availability of views from the individual buildings within such concentrations.

- Encroachment of large-scale structures toward the waterfront and hills, particularly Nob Hill, disturbs the pattern of "low, fine-scaled" buildings in these areas that is endorsed by the Urban Design Plan./17/

- Construction of highrise buildings along portions of Market Street diminishes the distinction between the two existing concentrations of large-scale structures in the C-3 District, one in the Downtown Office District, the other around Market and Polk Streets in the vicinity of the Civic Center./18/

- The construction of large buildings with hard or reflective curtain wall treatments impairs the "visual unity and special character of the city."/19/ Other facade treatments may also disturb existing visual patterns and sense of scale.

Figures IV.H.16 and IV.H.17 show possible skyline configurations as might be seen from Potrero Hill in the years 1990 and 2000. The methodology for the development of these figures is described in Appendix M; the base photograph for these figures is shown in Figure IV.H.6. Figure IV.H.8 provides a key to the names of selected existing buildings, as well as those under construction and proposed.

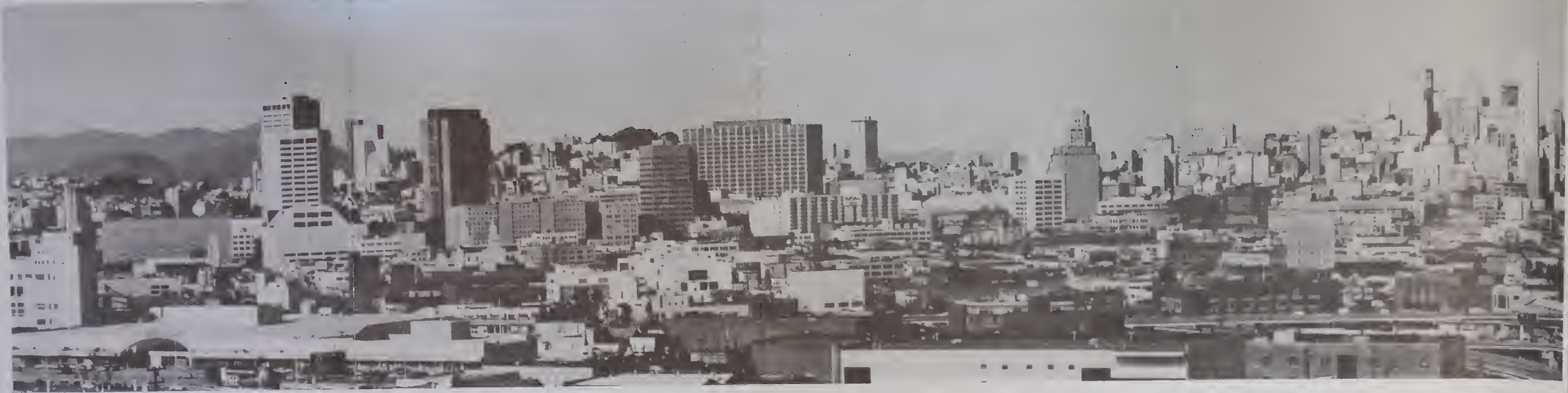
1990

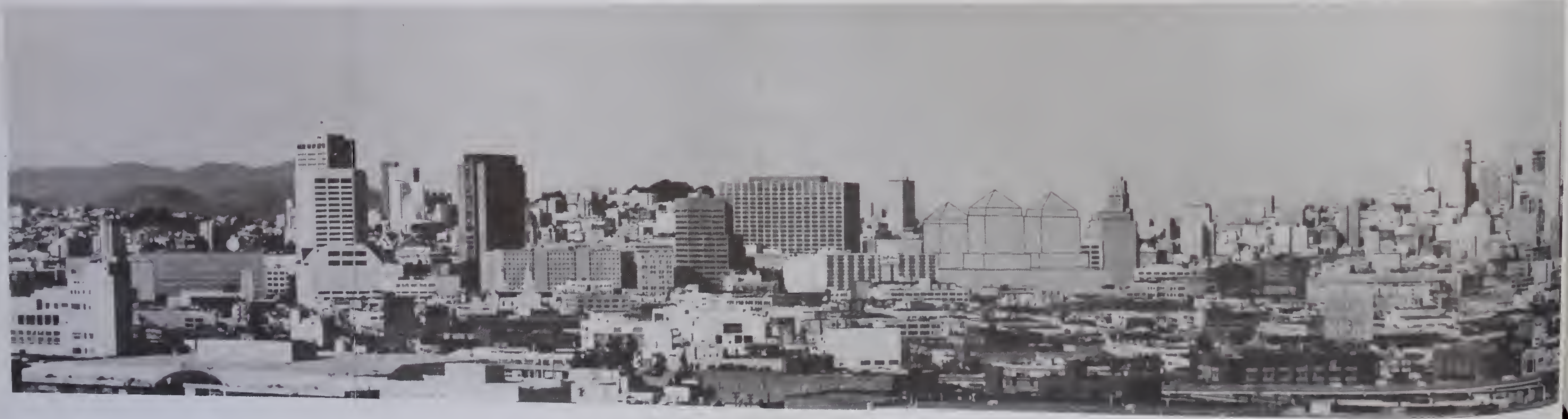
Buildings forecast to be completed through 1990 are shown in Figure IV.H.16./20/ Although the maximum height limits would not increase, a number of new buildings would approach those limits, would block sightlines between buildings, and would tend to further contribute to a flat, plateau-like skyline. Figure IV.H.16 also shows that relatively large-scaled buildings, currently concentrated in the Financial District would begin to be built on its fringes along Kearny Street, toward the waterfront, and in the Tenderloin.

2000

A configuration of the C-3 district skyline as it might appear when viewed from Potrero Hill in the year 2000 under the Downtown Plan is shown in Figure IV.H.17./20/ Under the Downtown Plan, the most conspicuous new buildings would be built south of Market Street and east of the YBC. As shown in Figure IV.H.17, the bulk controls of the Downtown Plan would tend to discourage the visual benching that characterizes much of the contemporary international style highrise development in the downtown area. Development under the Downtown Plan in the area south of Market Street and east of YBC could still result in some additional benching, however, particularly if future developers uniformly make maximum use of TDR to achieve common building heights. New buildings built under the Plan would generally not be tall enough to obscure the existing benching condition.

The provisions of the Plan for setbacks and sculpted tops would increase the variety of building configurations in the future skyline. Some views of existing architectural resources and some sightlines through major groups of buildings would be preserved. New construction under the Plan would also block some these views, from both distant vantage points and from existing buildings, but, in general, setbacks at upper levels and lower building height limits would lessen the impact.





NOTES:
-See Figure IV.H.8 for a reference key to selected existing buildings and buildings to be completed by 1990.
-YBC Redevelopment projects are shown in dark tone.

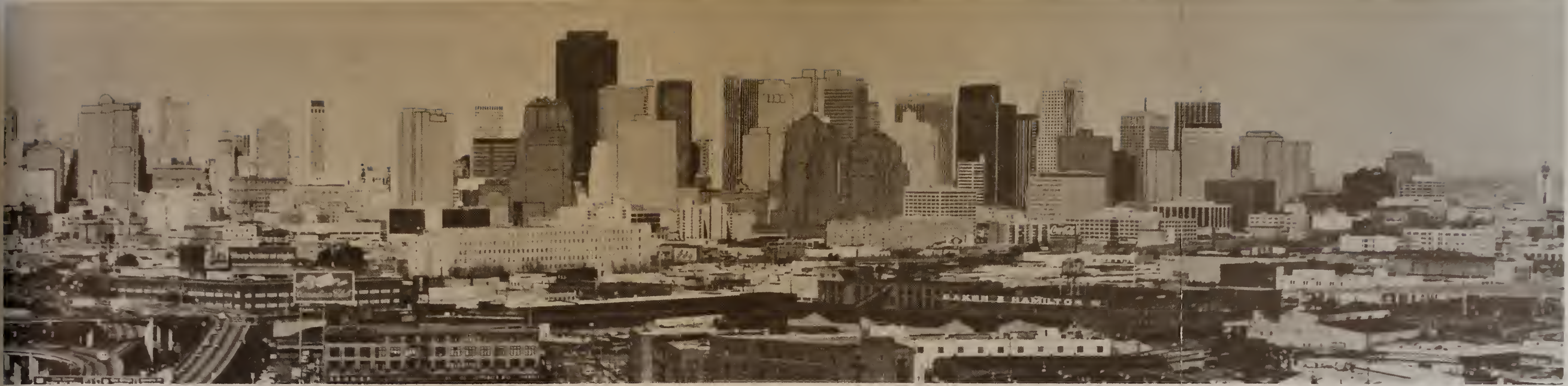


FIGURE IV.H.16:
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, 1990
SOURCE: Roger Owen Boyer and Associates

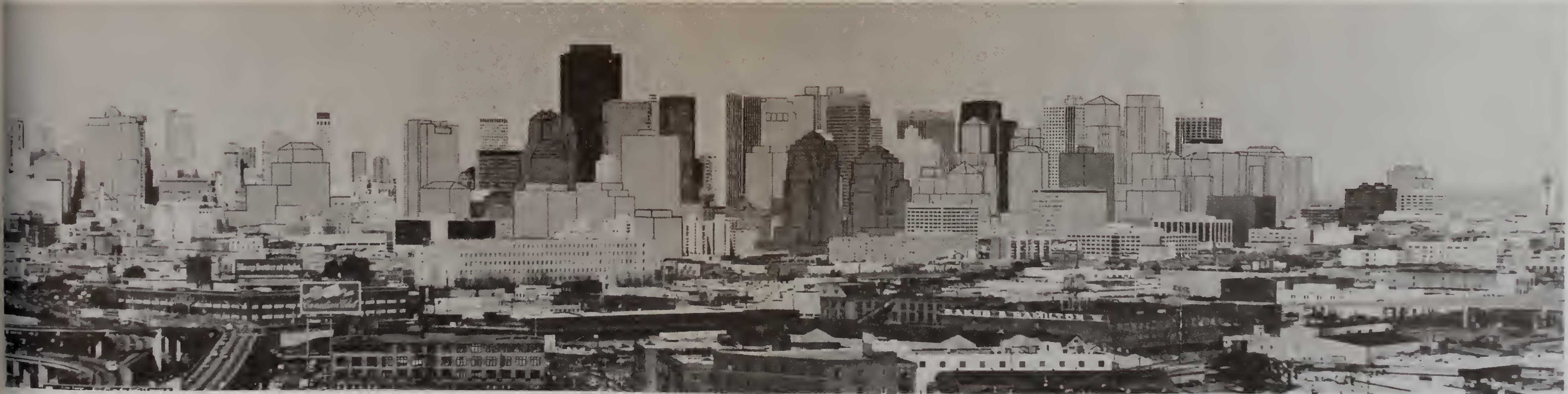


FIGURE IV.H.17:
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, DOWNTOWN PLAN, 2000
SOURCE: Roger Owen Boyer and Associates

Decreasing height limits from the financial district toward the Bay waterfront would tend to preserve the appearance of the skyline in this portion of the downtown. In the mid-Market Street area, however, one or more new buildings would be likely to partially obscure visual distinctions between the financial district and Nob Hill, and between building clusters in the financial district and Civic Center.

The Downtown Plan would have some additional effects on the future skyline that are not apparent in Figure IV.H.17. The Plan would prohibit the use of reflective glass and encourage the use of light-colored building materials. These provisions of the Plan would reduce the occurrence of discordant skyline elements produced by glare and excessive color contrasts in new buildings. The Plan would also encourage or require facade treatments such as cornices, belt courses, bay windows and other ornamental features, which, when viewed collectively at a distance would contribute to the visual richness and interest of the skyline.

Because the most intense new development between 1982 and 2000 would occur on and immediately outside the southern edge of the Financial District, views from viewpoints other than Potrero Hill would generally reveal fewer changes in the skyline than the view shown in Figure IV.H.17.

From a viewpoint at Treasure Island, the most conspicuous new buildings under the Downtown Plan would be apparent south of Market Street and east of YBC. Under the Plan, several high-rise buildings, ranging from a height of 80 feet to 550 feet, would appear stepping down from Mission Street towards Folsom Street. From the viewpoint of the Golden Gate Bridge Vista Point, north of the City, the Civic Center area is and would remain blocked by intervening hills, and most of the central office district buildings that would be built under the Downtown Plan would be blocked from view by existing development, including the Embarcadero Center. Views of new and future buildings near Chinatown at the northwest edge of the Central Office District would be blocked by Russian Hill. Visual changes in the western portion of the C-3 District, in the vicinity of Market and Van Ness Streets, would be most apparent in skyline views from Twin Peaks. New buildings in the downtown office district would be apparent , stepping down from Mission Street toward Folsom Street beyond the YBC.

NOTES - Architectural/Historic Resources and Urban Design

/1/ San Francisco Department of City Planning, Map entitled 1976 Architectural Inventory.

/2/ The Foundation for San Francisco's Architectural Heritage, Splendid Survivors, 1979 (hereinafter, Splendid Survivors), and "Supplemental Survey of the C-3 District," revised, December 1982.

/3/ The Foundation for San Francisco's Architectural Heritage, Michael Corbett, personal communications, January 7, April 1, 1983, and January 19, 1984.

/4/ See Appendix E for a detailed description of the survey and rating system.

/5/ See Appendix E for discussion of the criteria for designation of landmarks and for the protective characteristics of such status.

/6/ Splendid Survivors, p. 247.

/7/ San Francisco Landmarks Preservation Advisory Board Resolution No. 247, and Jonathan Malone, Secretary of the Landmarks Board, personal communication, January 18, 1984.

/8/ Rudolf Arnheim, The Dynamics of Architectural Form, Berkeley, California, 1977, p. 76.

/9/ Thomas Schumacher, "Buildings and Streets: Notes on Configuration and Use," Cambridge, Massachusetts, 1978, p. 145.

/10/ Throughout the urban design ("H") sections of this EIR, the cross-section along Sansome and Ecker Streets is used to provide representative illustrations of existing urban design conditions in the downtown, and to show how these conditions might change under the Downtown Plan (and its Alternatives). This particular cross-section of the C-3 district was chosen as generally representative of the C-3 district for several reasons:

- it illustrates a relatively wide range of height and bulk districts, and therefore a relatively wide range of urban design conditions and effects;
- it crosses areas of established growth (north of Market Street) and areas of generally high growth potential (south of Market Street), so the effects of future development may be clearly contrasted with those of existing development; and
- it crosses an area of relatively great employment density, and therefore illustrates conditions that will be experienced by a relatively large downtown population.

Where possible throughout the discussion of this cross-section, and selected locations along the cross-section, generalizations are drawn that apply to other areas in the C-3 district, or to the C-3 district as a whole. The illustrations of future conditions and effects that are drawn from the cross-section are constructed to be consistent with the land use and development forecasts described in Section IV.B., the inferred economic objectives of the future development described in Appendices D and G, and the requirements of the Downtown Plan (and its Alternatives) described in Section III. (and Section VII.).

NOTES - Architectural/Historic Resources and Urban Design (Continued)

/11/ Helmut Landsberg, The Urban Climate, New York, Academic Press, 1981.

/12/ The use of a "fish-eye" lens to obtain an "all-sky" photograph distorts the image severely. While the sun path data accurately depict the hours of the day and times of year that the sun is blocked by buildings, the qualitative perception of the amount of sky blocked by buildings is greater in the photograph than a pedestrian at the site would perceive.

/13/ As used in this section, "loss" is defined as demolition or substantial alteration of an existing building, including its vertical incorporation in whole or in part in new construction. Alteration results in the loss of cultural resources if it violates the Secretary of Interior's Guidelines for Rehabilitation of Historic Buildings and accompanying IRS regulations requiring retention of at least 75% of the exterior walls.

/14/ Article 1.2, Section 127, of the City and County of San Francisco Planning Code, states that TDR's from City Landmarks may only be transferred within the C-3-0 District, and to adjacent lots within that district. These provisions do not apply where the lot to receive the TDR is occupied by a historical, architectural or aesthetic landmark that has been so designated by the Board of Supervisors pursuant to Article 10 of the Code. The aggregate of all such transfers from one adjacent lot to all other lots shall be no more than one-half the basic floor area that would be permitted on the adjecent lot.

/15/ It is possible that the eight mile-per-hour wind criterion for new buildings under the Plan could require reductions in proposed sizes of some buildings from sizes which would otherwise be permitted by Plan. For the purposes of this EIR, it is assumed that any such required reductions would be relatively minor and would not affect the overall land use and development forecasts, or other forecasts, presented in this report.

/16/ Urban Design Plan, San Francisco Department of City Planning, 1971, p. 36; hereinafter Urban Design Plan.

/17/ Urban Design Plan, Fundamental Principle for Major New Development Number One, p. 32.

/18/ Urban Design Plan, Fundamental Principle for Major New Development Numbers Three and Four, p. 33.

/19/ Urban Design Plan, Fundamental Principle for Major New Development Number Six, p. 33.

/20/ Figures IV.H.16 and IV.H.17 depict possible views of skyline conditions in the years 1990 and 2000, as they might appear under the Downtown Plan. These graphics are not intended to be, nor can they be, accurate as to the specific configurations and locations of projects that were not yet proposed or built at the time of EIR preparation. The graphics are, however, faithful to configurations and distributions of possible future development, given the design controls embodied in the Plan, the development forecasts by C-3 District subarea for the Plan, and the distributions of reasonably developable sites within these subareas.

Since the production of the original graphics for this report, the San Francisco Redevelopment Agency has refined its proposals for specific projects in the Yerba Buena Center (YBC) Redevelopment Area. In Figures IV.H.16 and IV.H.17, the revised YBC proposals are represented in a darker shade than other projects shown.

I. AIR QUALITY

SETTING

Introduction

The Clean Air Act, adopted by Congress in 1970, gave the U.S. Environmental Protection Agency (EPA) the authority to set ambient air quality standards for pollutants determined to adversely affect public health and welfare. In 1971, the EPA established federal air quality standards for five major air pollutants: photochemical oxidants or ozone (standard revised in 1979), carbon monoxide (CO), total suspended particulates (TSP; in 1978 the EPA set a federal standard for lead, which makes up a portion of TSP), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). The 1977 Clean Air Act Amendments required that each state identify areas within its borders that did not meet federal ambient air quality standards ("non-attainment areas"), and devise a State Implementation Plan (SIP), subject to EPA approval, to attain the federal standards no later than 1987.

The California Air Resources Board (CARB) coordinates and oversees the activities of the State's many single and multi-county air quality management districts (AQMDs) and is responsible for incorporating local "non-attainment plans" into the SIP. The CARB and the AQMDs operate a number of air quality monitoring stations throughout the State. Data collected at these stations over the past few years are used by the CARB to classify areas as "attainment" or "non-attainment" with respect to the federal standards. The CARB also establishes state ambient air quality standards, and state emission standards for new vehicles, which in many cases are more stringent than the federal standards. In California, the more stringent of the federal and state standards applies; however, current air quality planning activities are focused on the federal ambient air quality standards. The local AQMDs participate in the development of non-attainment plans, and have primary responsibility for regulating air pollutant emissions from stationary sources.

The Bay Area Air Quality Management District (BAAQMD), the local agency empowered to regulate air quality in the nine Bay Area counties, operates a regional monitoring network which measures the ambient concentrations of the above-mentioned pollutants. On the basis of the monitoring data, the Bay Area, including San Francisco, is currently designated a non-attainment area for ozone and CO. A five-year summary (1978-82) of the data collected at the BAAQMD monitoring stations nearest the downtown area (monitoring at 939 Ellis St., adjacent to and west of the downtown area, was discontinued in 1979 and the equipment was moved to 900 23rd St., about two miles south of the downtown area) is shown in Table IV.I.1, together with the corresponding federal and/or state ambient air quality standards. Comparisons of these data with readings taken at other BAAQMD monitoring stations reveal that San Francisco's air quality is among the best of all the developed portions of the Bay Area. Two of the three prevailing winds, westerly and northwesterly, blowing off the Pacific Ocean reduce the potential for San Francisco to receive pollutants from elsewhere in the region. San Francisco's air quality problems are due largely to pollutant emissions from within the City, which also contribute to air quality problems in other parts of the Bay Area.

Existing Regional and Local Air Quality

Ozone

Regionally, the most severe and complex air quality problem is the relatively high level of ambient ozone experienced during warm, stable periods in summer and autumn. Ozone is not emitted directly into the atmosphere, but is produced in the atmosphere through a complex series of photochemical reactions involving emitted hydrocarbons and nitrogen oxides. No single source category accounts for most of the hydrocarbon and nitrogen oxide emissions, and the many mobile and stationary sources are spread throughout the region. Because of their sensitivity to weather variations, ozone levels can fluctuate widely from year to year. Ozone standards (one-hour federal and state, 0.12 parts per million (ppm) and 0.10 ppm, respectively) are exceeded most often in the Santa Clara, Livermore, and Diablo Valleys, because local topography and meteorological conditions during stable periods favor the build-up of ozone and its precursors there. The problem is most severe in San Jose and its southern suburbs, where ozone levels occasionally have approached the first-stage Health Advisory Level (0.2 ppm).

Over the five-year period from 1978 through 1982, no excesses of the federal ozone standard and two excesses of the state standard (both in 1978) have been recorded at the San Francisco monitoring stations. The potential for ozone standard excesses in San Francisco is still present, however. Although complete monitoring data for 1983 are

TABLE IV.I.1: SAN FRANCISCO AIR POLLUTANT SUMMARY, 1978-1982

STATION: 939 Ellis Street (1978-79) and 900 23rd Street (1980-82)

POLLUTANT:	STANDARD	1978	1979	1980	1981	1982
OZONE (O_3) (Oxidant)						
1-hour concentration (ppm (a))						
Highest hourly average	0.10 (b) 0.12 (c,d)	0.11	0.08	0.09	0.07	0.08
Number of state standard excesses		2	0	0	0	0
Expected Annual Excess (federal)(d)		0.3	0.0	0.0	0.0	0.0
CARBON MONOXIDE (CO)						
1-hour concentration (ppm)						
Highest hourly average	20 (b,e)	17	20	10	8	12
Number of standard excesses		0	1	0	0	0
8-hour concentration (ppm)						
Highest 8-hour average	9 (b,c)	9.4	13.8	7.5	5.3	9.1
Number of standard excesses		1	1	0	0	1
TOTAL SUSPENDED PARTICULATE (TSP)						
24-hour concentration (ug/m^3 (a))						
Highest 24-hour average	100 (b,f)	128	117	173	103	126
Number of standard excesses(g)		1	1	6	1	3
Annual concentration (ug/m^3)						
Annual Geometric Mean	60.0 (b,f)	42.6	42.0	52.1	56.0	57.0
Number of standard excesses		0	0	0	0	0
LEAD (Pb)						
30-day average concentration (ug/m^3)						
Highest 30-day average	1.5 (b)	1.9	1.2	0.9	0.6	0.7
Number of standard excesses(g)		1	0	0	0	0
NITROGEN DIOXIDE (NO_2)						
1-hour concentration (ppm)						
Highest hourly average	0.25 (b)	0.30	0.16	0.17	0.11	0.13
Number of standard excesses		4	0	0	0	0
SULFUR DIOXIDE (SO_2)						
24-hour concentration (ppm)						
Highest 24-hour average	0.05 (b)	0.024	0.034	0.018	0.016	0.017
Number of standard excesses(g)		0	0	0	0	0

(a) ppm: parts per million. ug/m^3: micrograms per cubic meter.
(b) State standard, not to be equaled or exceeded, except for CO standards which are not to be exceeded.
(c) Federal standard, not to be exceeded more than once per year (except for annual standards which are not to be exceeded).

(Continued)

TABLE IV.I.1: SAN FRANCISCO AIR POLLUTANT SUMMARY, 1978-1982 (Continued)

(d) The federal ozone standard was revised from 0.08 ppm to 0.12 ppm in January 1979. The Expected Annual Excess is a three-year average of annual excesses of the federal standard.
(e) The state one-hour CO standard was revised from 35 ppm to 20 ppm in January 1983. The federal one-hour standard remains 35 ppm.
(f) The CARB has redefined the state particulate standard to apply to "inhalable" particles only (i.e. those which have a diameter less than 10 microns). The new standards are 50 ug/m^3 for 24-hour averages and 30 ug/m^3 for the annual geometric mean. No data is currently available on the particle size distribution of the TSP sampled at the San Francisco monitoring station. According to the CARB, however, the new standards are "reasonably equivalent" to the old standards shown in the above table.
(g) Number of observed excess days (measurements taken once every six days).

SOURCE: BAAQMD, 1978-1982, Contaminant Summaries; and CARB, 1978-1982, Air Quality Data Summaries.

not yet available, the ozone level in San Francisco reached 0.13 ppm on September 12, 1983. In addition, hydrocarbons and nitrogen oxides emitted by sources in San Francisco are carried by wind to other parts of the Bay Area and contribute to formation of additional ozone in communities where the problem is more severe.

Carbon Monoxide

In contrast to ozone, CO is a sub-regional problem, because CO is a non-reactive pollutant with one major source category, motor vehicles. Ambient CO distributions generally follow the spatial and temporal distributions of vehicular traffic. Emissions from local vehicular traffic usually dominate local ambient concentrations near roadways. However, on late fall and winter evenings, the development of surface-based radiation inversions/1/ over large areas can limit upward dispersion of CO during the evening traffic peak hours. This trapped CO, resulting from the combined effects of many sources under the inversion, then can become an important component of the total ambient CO concentration. As a consequence, over 80% of ambient standard excesses in the Bay Area occur in November, December, and January, and 90% of these occur between 4 p.m. and 2 a.m. The greatest frequency of excesses occur on Friday, when vehicle use is greatest.

The one-hour federal CO standard (35 ppm) has not been exceeded at any monitoring station in the Bay Area over the past decade. The one-hour state standard (20 ppm) and the eight-hour federal and state standard (9 ppm) are frequently exceeded in some parts of the Bay Area. CO standards are exceeded most often in the Santa Clara Valley, an area of high traffic density and susceptibility to the formation of inversions. The highest CO levels in the Santa Clara Valley are usually recorded in downtown San Jose. Excesses of the federal and state eight-hour standard have been recorded in San Francisco. Such excesses do not occur as often and are not as severe as those in San Jose, largely because the City's location near the Pacific Ocean is not as favorable to the formation of inversions.

Total Suspended Particulate

Average annual levels of TSP in the Bay Area are typically low near the coast, since maritime air is relatively free of TSP. Concentrations average about 35 micrograms per cubic meter (ug/m^3), increase with distance inland, and reach a peak in dry, sheltered valleys. TSP levels in coastal cities such as San Francisco are typically 5 to 10 ug/m^3 higher than the maritime background level because of the high concentration of local sources there. The most important sources of TSP in San Francisco are demolition and construction activities, and motor vehicle travel over paved roads. The annual-average and 24-hour federal primary standards/2/ (75 ug/m^3 and 260 ug/m^3, respectively) have not been exceeded at any BAAQMD monitoring station in the past five years. However, the annual-average and 24-hour federal secondary standards/3/ (60 ug/m^3 and 150 ug/m^3, respectively) and the annual-average and 24-hour state standards (60 ug/m^3 and 100 ug/m^3, respectively) are occasionally exceeded at many monitoring stations. Only the 24-hour state and federal secondary TSP standard is exceeded in San Francisco, usually less than five times per year.

Motor vehicles using leaded fuels are the major source of lead emissions in the Bay Area, accounting for about 98% of the ambient lead. Monitoring data for 1974-78 show that excesses of the state quarterly standard and the federal monthly standard (both 1.5 ug/m^3) were most frequent at the San Francisco and San Jose monitoring stations. Since 1978, lead levels have decreased dramatically. The cause of this decrease can be traced to the increased use of unleaded fuel by motor vehicles. No excesses of the state or federal lead standards have been recorded in San Francisco during the years 1979-82.

Nitrogen Oxides

The major sources of nitrogen oxides, compounds which contribute to the formation of ozone, are vehicular, residential, and industrial fuel combustion. Monitoring data show that concentrations of NO_2, the most abundant form of ambient nitrogen oxides, are highest in the San Jose area, but are also high in the San Francisco and Oakland areas. While NO_2 levels in the Bay Area have occasionally exceeded the state one-hour standard (0.25 ppm), such occurrences have become less frequent in recent years because of the decrease in nitrogen oxide emissions from motor vehicles. The state standard was last exceeded at the San Jose monitoring station in 1980. The annual-average federal standard (0.05 ppm; there is no one-hour federal standard) has not been exceeded anywhere in the Bay Area over the past five years.

Sulfur Dioxide

The burning of high-sulfur fuels for activities such as electricity generation, petroleum refining, and shipping is the major source of ambient SO_2. The highest levels of SO_2 are recorded by monitoring stations located in a relatively narrow crescent centering on the bayshore of northern Contra Costa County, where the major sources are located, and extending over San Francisco and into the Sacramento River Delta. In December and January, air drainage from the Central Valley carries much of this SO_2 over San Francisco and causes the Bay Area maximums to be measured at the San Francisco monitoring station. Even so, these seasonal maximum concentrations rarely exceed 50% of the 24-hour state standard (0.05 ppm). The annual-average federal standard (0.03 ppm; there is no annual-average state standard) has not been exceeded anywhere in the Bay Area over the past five years. SO_2 levels at most Bay Area monitoring stations are less than 10% of the federal standard.

Air Quality Planning and Forecasting

Planning for the attainment and maintenence of federal and state air quality standards in the Bay Area is the joint responsibility of three agencies: the BAAQMD, the Association of Bay Area Governments (ABAG), and the Metropolitan Transportation Commission (MTC). Together they authored the 1982 Bay Area Air Quality Plan and, in December 1982, adopted and forwarded it to the State for incorporation into the SIP. The Plan proposes a number of additional controls on stationary and mobile sources of pollutant emissions, and sets forth an approximate schedule for adopting and implementing those controls so that the 1987 deadline for the attainment of federal ozone and carbon monoxide standards would be met.

The conclusions and strategies contained in the 1982 Air Quality Plan are supported by detailed information on the types and amounts of pollutant emissions from all the Bay Area's various sources, and mathematical modeling of pollutant behavior. The BAAQMD, in concert with ABAG and MTC, prepared an inventory of all pollutant sources in the Bay Area for the year 1979. Emissions of the same pollutants from all Bay Area sources for future years up to the year 2000 were forecast by adjusting the 1979 inventory for regional trends in population, employment, energy use, and the effectiveness of existing emission controls.

Estimated 1984 regional emissions associated with downtown development, and total emissions associated with all pollutant sources in the Bay Area, are shown in Table IV.I.2, p. IV.I.12.

Ozone Modeling for the 1982 Bay Area Air Quality Plan

In order to evaluate the impact of hydrocarbon and nitrogen oxide emission reductions on regional ozone levels, the Livermore Regional Air Quality (LIRAQ) model, a computer program which simulates the effects that meteorology, topography, and chemical interaction of pollutants have on Bay Area air quality, was developed. Using LIRAQ, the BAAQMD determined the sensitivity of ambient ozone levels to hydrocarbon and nitrogen oxide emission reductions. The Bay Area's ambient ozone concentrations were shown to be about equally affected by changes in the emissions of hydrocarbons and nitrogen oxides. However, such changes have opposite effects. Increasing hydrocarbon emissions would increase ozone concentrations, while an equal increase in nitrogen oxide emissions decreases the ozone concentration by about the same amount./4/ At present, an increase of one ton per day in the total Bay Area hydrocarbon emissions would increase the ozone concentration in the San Jose area by about 0.03 parts per hundred million (pphm). This sensitivity would increase to about 0.06 pphm of ozone for each additional ton of hydrocarbons when total Bay Area hydrocarbon emissions are reduced to near the point of ozone standard attainment. Increasing nitrogen oxide emissions would have approximately equal and opposite effects.

Even with an expected reduction of hydrocarbon emissions by 217 tons per day (brought about by existing hydrocarbon emission controls), the maximum hourly ozone level could still be as high as 0.14 ppm (0.02 ppm above the federal standard) in San Jose in 1987. In order to achieve the needed increment of air quality improvement, an additional region-wide hydrocarbon emission reduction of about 85 tons per day was found to be necessary. Additional controls on hydrocarbon emissions (a state-mandated motor vehicle inspection and maintenance program most prominent among them) were proposed to accomplish this goal.

Carbon Monoxide Modeling for the 1982 Bay Area Air Quality Plan

A different technique, called Modified Linear Rollback (MLR), was developed by ABAG to estimate the effects of additional emission control measures on CO concentrations in San Jose, Oakland, and Vallejo, where the most severe violations of CO standards had been experienced. When employed in conjunction with CO "hot spot" monitoring data, MLR can model the effects of local vehicular sources and the cumulative effects of distant sources under an inversion, and estimate expected CO levels near heavily traveled intersections./5/ CO concentrations at selected "hot spot" intersections and the proportional contribution of local and distant sources to such concentrations were determined by the BAAQMD through the analysis of monitoring data from permanent and "hot spot" monitoring stations./6/ The cumulative effects of distant sources were found to account for as much as 60% of ambient CO under an inversion./7/

Carbon Monoxide Modeling for Downtown San Francisco

Although CO standard violations had been recorded in San Francisco, ABAG concluded that, under then-current growth assumptions, existing control measures would alleviate this problem by 1987 and did not apply MLR during the preparation of the 1982 Bay Area Air Quality Plan. Using MLR, and the results of growth analyses for downtown San Francisco presented herein, projections were made by the consultant of the CO concentrations that could occur in downtown San Francisco in 1984 under the most adverse meteorological conditions. The results of these calculations for 11 selected intersections in the downtown study area are shown in Table IV.I.3, p. IV.I.16. Excesses of the state and federal eight-hour CO standard would be expected at four of the 11 intersections in 1984, but no excesses of the one-hour state or federal standards would be expected at any of the intersections.

Other Pollutants

In November 1980, the BAAQMD, ABAG, and MTC adopted a separate plan for TSP control. The plan indicated that excesses of the secondary TSP standard in the Bay Area were caused by sources which are difficult to control with current methods ("fugitive dust" emissions from construction activities and motor vehicle travel), and called for continued research and efforts to reduce the vehicle-miles traveled in the central San Jose area, which does not meet the secondary TSP standard (San Francisco is classified as an attainment area for TSP).

State and federal standards for lead, SO_2, and NO_2 are currently being met in the Bay Area and, unless major unanticipated growth occurs in the sources of these pollutants, the BAAQMD expects these standards to continue to be be met in the future.

IMPACTS

Short-term Construction Impacts

Demolition, excavation, and construction of new buildings in the downtown study area would generate TSP (dust) emissions and would probably cause violations of the state 24-hour TSP standard ($100ug/m^3$) in the immediate vicinity of construction sites. The concentrations of TSP and frequencies of standard violations would depend on the soil composition at the site, the types of machinery used, the construction schedule, and the proximity of other construction and demolition activities. It is not possible at the plan level of detail to make accurate projections of TSP concentrations and frequencies of standard violations caused by construction and demolition activities.

Diesel-powered construction equipment would emit, in decreasing order by weight, NOx, CO, SOx, HC, and TSP. Such emissions would contribute to the total concentrations of these pollutants, but probably would not cause violations of their standards.

Long-term Operation Impacts

Compatibility with Air Quality Plans

Relationship of the Downtown Plan with Air Quality Policies of the Master Plan. The Downtown Plan is proposed to become a part of the San Francisco Master Plan and does not contain specific implementing actions concerning air quality. Air quality objectives and policies of the Master Plan, which are not contained within the Downtown Plan, further define planning in San Francisco and the region.

The Plan for Conservation, a section of the Environmental Protection Element of the Master Plan, contains one air quality objective to "Assure that the ambient air of San Francisco and the bay region is clean, provides maximum visibility, and meets air quality standards."/8/ Development resulting from the Downtown Plan could lead to an increase in the frequency of violations of the TSP standards in San Francisco and the NO_2 standard in the Bay Area. However, this does not take into account emissions from traffic travelling to work locations in other areas of the region that may be less well-served by transit, instead of to work in the C-3 District, that may occur as a result of the Plan. These emissions are not expected to represent significant or substantial additions to the regional pollutant totals.

Policy 3 of the Air Objective of the Plan for Conservation is applicable to the downtown and would "Encourage greater use of transit in the downtown area and restrict the use of motor vehicles where such use would impair air quality." The Downtown Plan contains policies to "Improve speed of transit travel and service where conflicts with auto traffic occur, and [to establish] a transit preferential street system." The Plan would also "Discourage new long-term parking spaces in and around downtown," and would "Develop he Downtown core as an automobile control area." These and other transportation policies and their implementing actions are discussed on pp. 111-145 of the proposed Downtown Plan and relate directly to air quality Policy 3.

982 Bay Area Air Quality Plan. Downtown development under the Downtown Plan would not directly conflict with the pollution reduction strategies recommended by the 1982 Bay Area Air Quality Plan. These strategies consist primarily of hydrocarbon and carbon monoxide emission controls on stationary sources and motor vehicles, and transportation improvements, and are aimed at attaining the federal ozone and carbon monoxide standards.

In order to present a worst-case analysis, the downtown development-related emissions projected by this EIR are considered to be new emissions not forseen by the Air Quality Plan. It is likely, however, that some overlap exists between the downtown development-related emissions projected by this EIR and the total Bay Area emissions forecast by the Air Quality Plan, because growth assumptions were included in the Air Quality Plan. The amount of overlap cannot be determined because the methodology used by this EIR, which is appropriate to a single "project" (even at the plan level of detail), cannot be directly compared with the methodology used by the Air Quality Plan, which encompasses the entire Bay Area. In any case, emissions associated with downtown development under the Downtown Plan are not projected by this EIR to increase ozone concentrations or to result in violations of CO standards (see below), and thus would not indirectly conflict with the objectives of the 1982 Bay Area Air Quality Plan.

Pollutant Emissions

Downtown development would cause additional air pollutant emissions throughout the region. Most of these emissions would be associated with motor vehicle travel. Motor vehicles would emit, in decreasing order by weight, CO, TSP, NOx, HC, and SOx. Natural gas combustion for building operation in downtown San Francisco (for heating and air conditioning) would contribute relatively little (less than three percent, on average) to total emissions. Natural gas combustion would emit, in decreasing order by weight, NOx, CO, TSP, HC, and SOx. Estimated emissions in 1984 and projected future regional emissions associated with downtown-related motor vehicle travel, and with natural gas combustion by downtown buildings, under the Downtown Plan are shown in Table IV.I.2. These emissions also are compared in Table IV.I.2 to regional emissions associated with all pollutant sources in the Bay Area.

In addition, use of electric energy for building operation in the downtown and for buildings related to downtown development but located elsewhere in San Francisco and the Bay Area, and for downtown-related transportation (BART), would generate emissions at PG&E's oil-fired power plants, some of which are located in San Francisco and in Solano and Contra Costa Counties. Electricity generation would emit, in decreasing order by weight, SOx, NOx, TSP, CO, and HC. Lastly, natural gas combustion for activities related to downtown development but located outside the downtown study area would generate emissions throughout the Bay Area. These emissions generated by building and transportation electricity use and by non-downtown building natural gas combustion cannot be reliably quantified, are expected to be relatively minor, and are not reflected in Table IV.I.2 or in the following discussions.

TABLE IV.I.2: ESTIMATED AND PROJECTED DOWNTOWN-RELATED AND BAY AREA POLLUTANT EMISSIONS, 1984, 1990, and 2000 UNDER THE DOWNTOWN PLAN (tons per day) (a)

	HC	NOx	CO	TSP	SOx
1984 Total					
Downtown-related vehicular travel	5.7	8.1	70.6	7.8	0.7
Downtown building natural gas use	0.1	1.0	0.2	0.1	0
Total Downtown (b)	5.8	9.1	70.8	7.9	0.7
Total Bay Area (c)	541	581	2594	515	187
1990 Increment					
Downtown-related vehicular travel	0.6	0.8	6.8	1.1	0.1
Downtown building natural gas use	0	0	0	0	0
Subtotal Downtown (d)	0.6	0.8	6.8	1.1	0.1
Subtotal Bay Area (e)	-113	-23	-642	+47	+7
1990 Total					
Downtown-related vehicular travel	4.7	6.1	56.0	8.9	0.8
Downtown building natural gas use	0.1	1.1	0.2	0.1	0
Total Downtown (b)	4.8	7.2	56.2	9.0	0.8
Total Bay Area (c)	428	558	1952	562	194
Downtown Plan 2000 Increment					
Downtown-related vehicular travel	0.6	0.8	6.6	1.3	0.1
Downtown building natural gas use	0	0.1	0	0	0
Subtotal Downtown (f)	0.6	0.8	6.6	1.3	0.1
Subtotal Bay Area (g)	0	+52	-69	+87	+39
Downtown Plan 2000 Total					
Downtown-related vehicular travel	5.0	5.9	53.5	10.0	0.9
Downtown building natural gas use	0.1	1.1	0.2	0.1	0
Total Downtown (b)	5.1	7.1	53.7	10.1	0.9
Total Bay Area (c)	428	610	1883	649	233

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a) Totals may not equal sums of components due to rounding. Downtown emissions were calculated using BAAQMD EMFAC-6C vehicular emission factors and EPA AP-42 natural gas combustion emission factors. Vehicular emissions of HC, NOx, and CO include an ssumed three minutes of idling time per trip. Vehicular emissions of TSP include 2.0 grams per mile for dust re-entrainment on paved roads.

b) Accumulative total regional traffic and building natural gas emissions associated with C-3 District for each year analyzed

c) Accumulative total regional emissions associated with all Bay Area pollutant sources or each year

d) Incremental regional traffic and building natural gas emissions associated with new C-3 District employment/visitation and buildings, respectively, added between 1984 and 1990

e) Incremental change in regional emissions associated with all Bay Area pollutant sources between 1984 and 1990

TABLE IV.I.2: ESTIMATED AND PROJECTED DOWNTOWN-RELATED AND BAY AREA POLLUTANT EMISSIONS, 1984, 1990, and 2000 UNDER THE DOWNTOWN PLAN (tons per day) (a) (Continued)

(f) Incremental regional traffic and building natural gas emissions associated with new C-3 District employment/visitation and buildings, respectively, added between 1990 and 2000
(g) Incremental change in regional emissions associated with all Bay Area pollutant sources between 1990 and 2000

SOURCE: Environmental Science Associates, Inc.; and ABAG, BAAQMD, MTC, 1982 Air Quality Plan, pp. 42, 53, and 112.

1990. Although new downtown development between 1984 and 1990 would generate additional pollutant emissions, total HC, NOx, and CO emissions associated with the entire downtown study area are projected to be less in 1990 than in 1984 because declining HC, NOx and CO emission rates per average motor vehicle (due to the continuing introduction into the vehicle fleet of new vehicles equipped with improved emission controls; see Appendix O, Table O.5) would more than offset the increased number of emission sources associated with new downtown development. Total TSP and SOx emissions associated with the entire downtown study area are projected to be greater in 1990 than in 1984 because average-vehicle emission rates would decline only slightly for TSP and not at all for SOx (see Table IV.1.2).

2000. Although new downtown development under the Downtown Plan between 1990 and 2000 would generate additional pollutant emissions, total NOx and CO emissions associated with the entire downtown study area are projected to be less in 2000 than in 1990 because declining NOx and CO emission rates per average motor vehicle would continue to more than offset the increased number of emission sources associated with new downtown development. Total HC emissions associated with the entire downtown study area are projected to be greater in 2000 than in 1990, although total HC, NOx, and CO emissions are all projected to be less in 2000 than in 1984. Total TSP and SOx emissions associated with the entire downtown study area are projected to be greater in 2000 than in 1990 and in 1984 because average-vehicle emission rates would decline only slightly for TSP and not at all for SOx (see Table IV.I.2).

Ozone Concentrations

Motor vehicles associated with downtown development would emit about 30% more (on average) NOx than HC (both of which are chemical precursors of ozone), while emissions from building natural gas combustion would consist primarily of NOx. On the basis of the LIRAQ ozone simulations conducted for the 1982 Bay Area Air Quality Plan (see Setting, p. IV.I.2), NOx emissions in excess of HC emissions could lead to a slight decrease in peak ozone concentrations in the Bay Area. It is possible that excess NOx emissions could increase ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area.

1990. In 1990, NOx emissions resulting from new downtown growth would exceed HC emissions by about 0.2 tons per day. Thus, if the strategies recommended in the 1982 Bay Area Air Quality Plan for HC emission reductions (64% of which would come from stationary source controls, 33% from motor vehicle inspection and maintenance, and three percent from transportation measures) are successful, Bay Area ozone concentrations would be expected to be within the federal standard in 1987 and thereafter, regardless of development of new commercial space in downtown San Francisco. Furthermore, development in downtown San Francisco would not increase the Bay Area ozone concentrations which would otherwise occur (because of the NOx "quenching" effect discussed above). This would be the case even with the assumption that the associated HC and NOx emissions are new (i.e., even assuming they are not included in the 1982 Bay Area Air Quality Plan projections).

However, excess NOx emissions associated with new downtown development might have a relatively small effect (compared to that of total Bay Area or non-Bay Area emissions, because of dilution over time and distance) on increasing ozone and/or nitrogenous oxidant concentrations outside the Bay Area.

2000. In 2000, NOx emissions resulting from new downtown growth under the Downtown Plan between 1990 and 2000 and between 1984 and 2000 would exceed HC emissions by bout 0.2 tons per day. Thus, as in 1990, Bay Area ozone concentrations would be xpected to be within the federal standard in 1987 and thereafter through the year 2000 egardless of development of new commercial space in downtown San Francisco under the Downtown Plan. Furthermore, development in downtown San Francisco would not increase he Bay Area ozone concentrations which would otherwise occur. This would be the case ven with the assumption that the associated HC and NOx emissions are new.

However, as in 1990, excess NOx emissions associated with new downtown development might have a relatively small effect (compared to that of total Bay Area or non-Bay Area emissions) on increasing ozone and/or nitrogenous oxidant concentrations outside the Bay Area.

Carbon Monoxide Concentrations

Unlike ozone, CO concentrations exhibit significant variations, because CO concentrations are responsive both to area-wide and local emission patterns. Motor vehicles are expected to be the source of about 78% and 74% of the CO emissions in the Bay Area in 1990 and 2000 respectively. CO concentrations in 1990 and 2000 at 11 selected intersections in the downtown study area (where CO concentrations would be expected to be relatively high) under the Downtown Plan were projected using Modified Linear Rollback (MLR) (see Setting, p. IV.I.4). The background and local components were calculated separately, and then added to obtain the total CO concentrations shown in Table IV.I.3.

Future background concentrations would be affected by changes in area-wide vehicular travel and in the amount of CO emitted by the average motor vehicle. Increased area-wide traffic volumes would be offset by decreased average-vehicle emission rates in 1990 and 2000. The contribution of local sources to the total CO concentrations would vary from intersection to intersection, depending on traffic volumes. However, increased local traffic volumes also would be offset by decreased average-vehicle emission rates in 1990 and 2000.

1990. In 1990, traffic volumes in the downtown study area would increase by about eight percent area-wide over 1984 volumes. However, in 1990 the average vehicle is expected to emit about 32% less CO than in 1984, due to the continuing introduction into the vehicle fleet of new vehicles equipped with improved emission controls. The resulting background CO component in 1990 would be about 74% of the 1984 background component. Local CO components also would be less in 1990 than in 1984.

In 1990, total CO concentrations at all 11 downtown intersections analyzed are projected to be lower than those in 1984. The number of intersections experiencing state or federal CO standard excesses is projected to decrease from four in 1984 to zero in 1990 (see Table IV.I.3).

TABLE IV.I.3: EXISTING AND PROJECTED WORST-CASE CURBSIDE CARBON MONOXIDE CONCENTRATIONS, AT SELECTED INTERSECTIONS IN THE DOWNTOWN STUDY AREA, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN (parts per million)

Intersection	Averaging Time	Concentrations (a) 1984	1990	Downtown Plan 2000
Battery & Washington	1-hour	13.0	9.5	8.3
	8-hour	8.9	6.5	5.8
Battery & Clay	1-hour	13.0	9.5	8.3
	8-hour	8.6	6.7	6.0
Beale & Mission	1-hour	12.0	9.8	8.8
	8-hour	8.3	6.8	6.1
Brannan & Sixth	1-hour	18.1	12.3	11.5
	8-hour	12.0	9.0	8.3
Bryant & Second	1-hour	12.9	9.4	8.4
	8-hour	9.2	6.7	6.1
California & Montgomery	1-hour	12.3	8.7	7.6
	8-hour	8.6	6.3	5.6
First & Mission	1-hour	13.8	9.5	8.4
	8-hour	9.4	6.8	6.1
First & Harrison	1-hour	11.6	8.1	7.3
	8-hour	8.0	6.1	5.6
Howard & New Montgomery	1-hour	13.0	9.4	8.3
	8-hour	8.7	6.3	5.7
Market & Third	1-hour	13.1	9.1	8.0
	8-hour	9.5	6.9	6.3
Stockton & Sutter	1-hour	12.6	8.9	8.1
	8-hour	9.0	6.5	5.8

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a) The tabulated concentrations are the sum of a background component, which is nfluenced by the cumulative effects of all vehicular traffic in the project vicinity, and a ocal component, which reflects the effects of vehicular traffic at the intersection of nterest. Both components were calculated by the Modified Linear Rollback (MLR) method. A full description of MLR can be found in ABAG Air Quality Technical Memo 43, January 1983. Concentrations are in parts per million. Underlined values are in excess of the state or federal CO standards. The one-hour state standard is 20 ppm; the one-hour federal standard is 35 ppm; the eight-hour state and federal standard is 9 ppm.

SOURCE: Environmental Science Associates

2000. In 2000, traffic volumes in the downtown study area would increase by about 7% area-wide over 1990 volumes and by about 15% area-wide over 1984 volumes. However, in 2000 the average vehicle is expected to emit about 17% less CO than in 1990 and about 43% less than in 1984. The resulting background CO component in 2000 would be about 88% of the 1990 background and about 65% of the 1984 background components. Local CO components also would be less in 2000 than in 1990 and in 1984.

In 2000, total CO concentrations under the Downtown Plan at all 11 downtown intersections analyzed are projected to be lower than those in 1990 and in 1984. The number of intersections experiencing CO standard excesses is projected to decrease from four in 1984 to zero in 1990 and 2000 (see Table IV.I.3).

Total Suspended Particulate Concentrations

1990. Motor vehicles are expected to be the source of about 50% of the TSP emissions in the Bay Area in 1990. Traffic volumes in the downtown study area are expected to increase by about eight percent area-wide from 1984 to 1990; average-vehicle emission rates are expected to decrease by about one-half percent. Because roughly the same proportionality would hold between TSP emissions and TSP concentrations, the average annual TSP concentration in the downtown area would increase by about four percent from 1984 to 1990. This could increase the frequency of TSP standard violations in San Francisco, with concomitant health effects and reduced visibility.

2000. Motor vehicles are expected to be the source of about 54% of the TSP emissions in the Bay Area in 2000. Traffic volumes in the downtown study area are expected to increase by about seven percent area-wide from 1990 to 2000 and by about 15% area-wide from 1984 to 2000; average-vehicle emission rates are expected to decrease by about one percent from 1990 to 2000 and by about two percent from 1984 to 2000. Because roughly the same proportionality would hold between TSP emissions and TSP concentrations, the average annual TSP concentration in the downtown area under the Downtown Plan would increase by about three percent from 1990 to 2000, and by about seven percent from 1984 to 2000. This could increase the frequency of TSP standard violations in San Francisco, with concomitant health effects and reduced visibility.

Nitrogen Dioxide Concentrations

1990. Total NOx emissions in the Bay Area are expected to decrease by about 23 tons per day from 1984 to 1990. In 1990, downtown development-related vehicular traffic and building natural gas combustion would generate about 0.8 tons per day of NOx. Thus in 1990, downtown development would generate NOx emissions equivalent to about three percent (or less, due to overlap between the projections) of the expected Bay Area NOx reduction by 1990. Total downtown and Bay Area emissions would remain below 1984 levels.

Much of this NOx would be in the form of NO_2 or would be converted from NO to NO_2 in the atmosphere. NO_2 standards are currently being met in the Bay Area and NO_2 concentrations would be expected to be lower in 1990 than they are currently, because of the expected decline in Bay Area NOx emissions.

2000. Total NOx emissions in the Bay Area are expected to increase by about 52 tons per day and 29 tons per day from 1990 and 1984, respectively, to 2000. In 2000, downtown development-related vehicular traffic and building natural gas combustion, added between 1990 and 2000 and between 1984 and 2000, would generate about 0.8 tons per day and 1.5 tons per day respectively of NOx. Thus in 2000, downtown development under the Downtown Plan would generate NOx emissions which would increase the expected Bay Area NOx increase from 1984 to 2000 by about five percent (or less, due to overlap between the projections). Total downtown emissions would remain below 1990 and 1984 levels.

Much of this NOx would be in the form of NO_2 or would be converted from NO to NO_2 in the atmosphere. NOx also reduces visibility, and contributes to the formation of acid rain. Incremental NOx emissions generated by downtown development in 2000 could lead to violations of the NO_2 standard with concomitant health effects; could reduce visibility; or to a relatively small extent (due to the small magnitude of the increase and to dilution over time and distance), could increase acid rain further downwind, outside the Bay Area.

Sulfur Dioxide Concentrations

1990. Total Bay Area emissions of SO_2 are expected to increase by about three percent from 1984 to 1990. In 1990, SO_2 emissions from downtown development-related sources would be relatively low, about 0.1 tons per day, because vehicles and buildings use low-sulfur fuels such as gasoline, diesel oil, and natural gas. Because the ambient concentrations of SO_2 are currently low (about 25% of the standard in 1982), emissions from downtown development-related sources would probably not bring San Francisco's SO_2 concentrations significantly closer to violating the standard.

2000. Total Bay Area emissions of SO_2 are expected to increase by about 16% and 19% from 1990 and 1984, respectively, to 2000. In 2000, SO_2 emissions from downtown development-related sources, added between 1990 and 2000 and between 1984 and 2000, would be relatively low, about 0.1 tons per day and 0.2 tons per day respectively, because vehicles and buildings use low-sulfur fuels. Because the ambient concentrations of SO_2 are currently low, emissions from downtown development-related sources under the Downtown Plan would probably not bring San Francisco's SO_2 concentrations significantly closer to violating the standard.

NOTES - Air Quality

/1/ An inversion is a condition under which warm air aloft limits upward dispersion of pollutants contained in a colder layer of air near the surface.

/2/ Primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

/3/ Secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

/4/ ABAG, BAAQMD, MTC, July 1982, 1982 Bay Area Air Quality Plan, LIRAQ Ozone Sensitivity Analysis, pp. 73-79. This report is on file and available for public review at the Department of City Planning, 450 McAllister Street, fifth floor.

/5/ A full description of Modified Linear Rollback can be found in ABAG, BAAQMD, MTC, January 1982, Methodology for Projecting Future Carbon Monoxide Levels and Estimating Control Measure Effectiveness in the 1982 Plan, Air Quality Technical Memo 43. This memo is on file and available for public review at the Department of City Planning, 450 McAllister Street, fifth floor.

/6/ ABAG, BAAQMD, MTC, June 1980, Summary of 1979/80 CO Hotspot Monitoring Program, Air Quality Technical Memo 33; ABAG, BAAQMD, MTC, January 1982, Results of the 1980/81 Hotspot Monitoring Program for Carbon Monoxide, Air Quality Technical Memo 40; ABAG, BAAQMD, MTC, April 1982, Urban Background Carbon Monoxide Levels in the Bay Area, Air Quality Technical Memo 42. These memos are on file and available for public review at the Department of City Planning, 450 McAllister Street, fifth floor.

/7/ R.E. DeMandel, Senior Air Pollution Meteorologist, BAAQMD, letter, August 2, 1983.

/8/ The Plan for Conservation, a section of the Environmental Protection Element of the Master Plan, was adopted by Resolution 7020 of the San Francisco City Planning Commission on May 24, 1973.

J. NOISE

SETTING

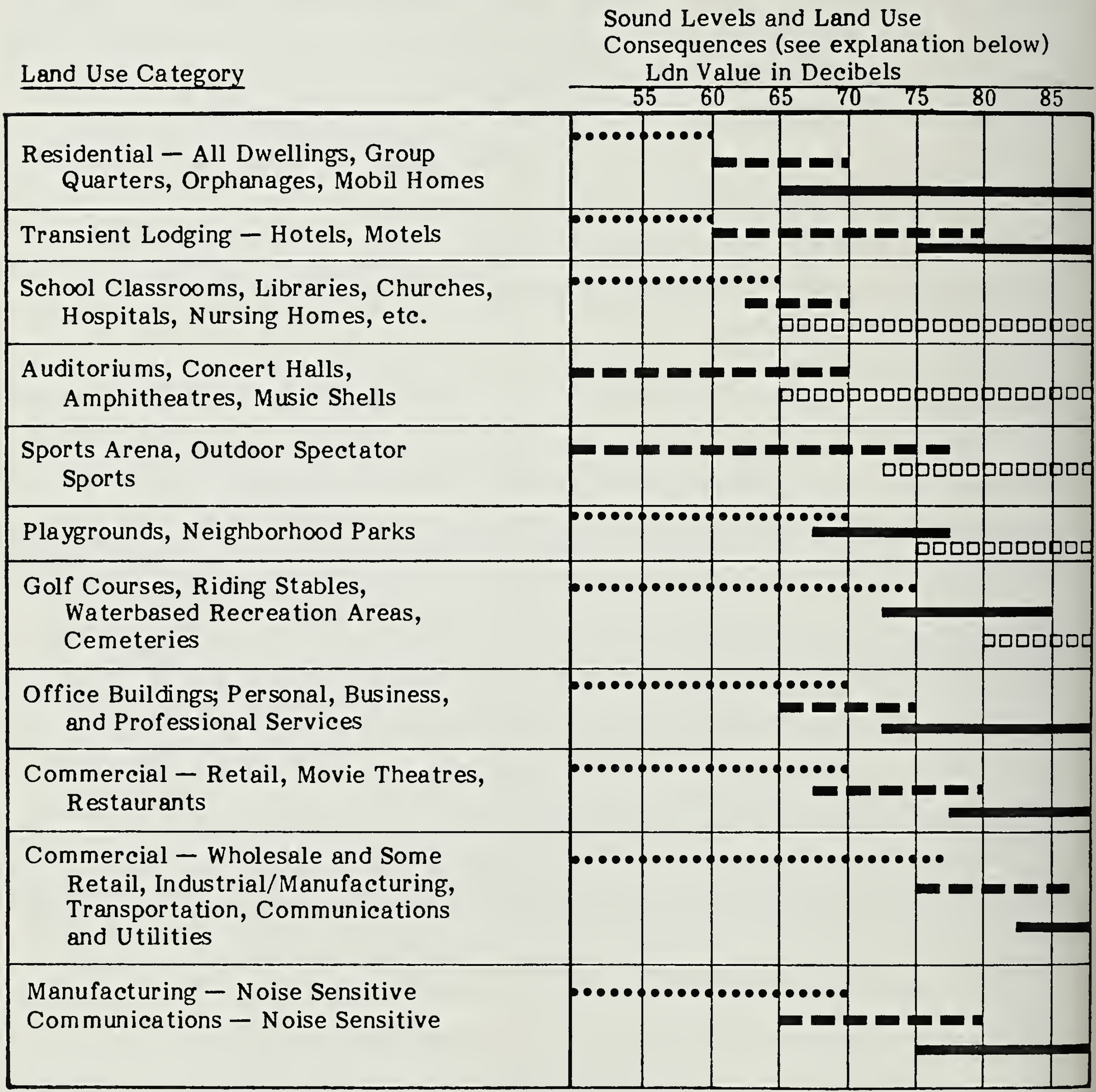
The noise environment of the C-3 District Study Area is dominated by traffic noise. This noise is of two basic types: 1) a near-constant background "noise," and 2) intrusive or peak noises, which tend to be isolated events that stand out from the background noise. Although both types of noise may affect the quality of life in a particular area, most environmental noise standards regulate constant background noise. Studies/1/ have found that the primary cause of hearing loss is cumulative long-term exposure to near-constant noise sources. Intrusive noise, although not generally a cause of permanent hearing loss/2/, does contribute to stress, irritability, increased blood pressure, loss of sleep and low work efficiency./3,4,5,6/

Noise intensity is measured in decibels (dB). Because the human ear is more sensitive to some frequencies than others, environmental noise is customarily measured in "A-weighted" decibels, or dBA./7/ The threshold of human hearing is at about 20 dBA; noise levels in a quiet library are about 40 dBA; normal speech (at a distance of three feet) is about 60 dBA; garbage disposals and electric blenders generate about 80 to 85 dBA (at a distance of five feet); a pile driver produces about 105 dBA (at 50 ft.). The U.S. Environmental Protection Agency (EPA) has established the 24-hour Day-Night Level (Ldn)/8/ as the accepted descriptor of cumulative exposure to background noise levels over a 24-hour period. According to the EPA/1/, an Ldn of 55 dBA is the maximum acceptable to avoid interference with outdoor activities, and an Ldn of 70 dBA is the maximum acceptable to avoid long-term hearing loss./9/

The City of San Francisco has established land-use compatibility criteria for community noise/10/, based on the EPA findings. These criteria, expressed in Ldn, are shown in Figure IV.J.1. Table IV.J.1 lists the City's objectives and policies, contained in the Plan for Transportation Noise Control./10/

Table IV.J.2, p. IV.J.9, shows existing 1984 traffic noise levels along major streets in the C-3 District, by subarea. The 24-hour Ldns shown are based on peak-period noise measurements made at 11 locations/11/, adjusted to provide estimates based on 24-hour traffic./12/ These 24-hour noise levels, intrusive noise levels, and their compatibility with existing land uses, are discussed by subarea, below.

FIGURE IV.J.1: LAND USE COMPATIBILITY CHART FOR COMMUNITY NOISE



Explanation of Land Use Consequences

●●●●●●●●●●●●	Satisfactory, with no special nose insulation requirements.
▬ ▬ ▬ ▬ ▬	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
━━━━━━━━	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
□□□□□□□□□□	New construction or development should generally not be undertaken.

SOURCE: City and County of San Francisco, Department of City Planning

TABLE IV.J.1: OBJECTIVES OF SAN FRANCISCO PLAN FOR TRANSPORTATION NOISE CONTROL

OBJECTIVE 1:	Reduce transportation-related noise.	
Policy 1:		Enforce noise emission standards for vehicles.
Policy 2:		Impose traffic restrictions to reduce transportation noise.
Policy 3:		Limit City purchases of vehicles to models with the lowest noise emissions, and adequately maintain City-owned vehicles and travel surfaces.
Policy 4:		Regulate use of emergency sirens.
Policy 5:		Retain and expand the electric trolley network.
Policy 6:		Discourage changes in streets which will result in greater traffic noise in noise-sensitive areas.
OBJECTIVE 2:	Minimize the impact of noise on affected areas.	
Policy 1:		Promote site planning, building orientation and design, and interior layout that will lessen noise intrusion.
Policy 2:		Promote the incorporation of noise insulation materials in new construction.
Policy 3:		Construct physical barriers to reduce noise transmission from heavy traffic carriers.
OBJECTIVE 3:	Promote land uses that are compatible with various transportation noise levels.	
Policy 1:		Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use (see Figure IV.J.1).
Policy 2:		Consider the relocation to more appropriate areas of those land uses which need more quiet and cannot be effectively insulated from noise in their present location, as well as those land uses which are noisy and are presently in noise-sensitive areas.
Policy 3:		Locate new noise-generating development so that the noise impact is reduced.

SOURCE: City and County of San Francisco, Department of City Planning, September 1974, Plan for Transportation Noise Control, Environmental Protection Element of the Comprehensive Plan, adopted by Resolution 7244 of the San Francisco City Planning Commission.

Subarea 1

Street-level 24-hour Ldns range from about 70 dBA to about 76 dBA in the Central Office Subarea (see Table IV.J.2, p. IV.J.10). The noisiest streets are the major arteries of the City's financial center: California, Pine, Bush and Kearny Sts. Although traffic tends to move slowly in this subarea (due to congestion, narrow streets and few lights timed for traffic "pulses"), traffic volumes and concentrations are among the highest in the C-3 District./13/ Heavy use has contributed to uneven road surfaces, which have increased traffic noise. Continuous facades of high-rise buildings, particularly along Montgomery, Sansome, Pine, Bush and California Sts., reflect noise. Sections of these streets are becoming "noise canyons," which do not let noise dissipate effectively.

The primary source of intrusive noise in Subarea 1 is accelerating diesel buses, which produce noise peaks of 80 dBA to 95 dBA. Mission St. near the Transbay Terminal experiences most of the diesel bus traffic, with Market St. experiencing almost as much. Five diesel bus lines/14/ use Mission St., resulting in 42 buses passing the Transbay Terminal during the evening peak hour. Market St. also has five diesel bus lines/15/ in that vicinity, and experiences 40 buses passing a given point during the evening peak hour. Neither of these volumes is sufficient to measurably affect the 24-hour Ldn. Frequent occurrences of noise levels up to 95 dBA are, however, annoying.

Construction is another source of intrusive noise in Subarea 1. About thirty office projects are under construction in downtown San Francisco./16/ The majority of these are in Subarea 1. Typical construction noise levels range from about 85 dBA to 90 dBA at a distance of 50 ft./17/ This is loud enough to raise interior noise levels (with windows closed) to 60 dBA or greater in buildings within 150 ft. (about one-half block) of the construction site. These noise levels require raising one's voice to be heard, and are disruptive to concentration and work efficiency. Piledriving is frequently necessary for new buildings in Subarea 1, because most of it is underlain by artificial fill. Piledriving produces noise levels of about 105 dBA at 50 ft./17/, loud enough to raise interior noise levels to 60 dBA or greater within about 1,500 ft. of the construction site (about four to five blocks) for locations with no intervening buildings to block some of the sound. Although construction noise at specific sites is temporary, the collective effects of a number of buildings under construction simultaneously makes construction noise a current problem in many locations in Subarea 1.

The dominant land uses in Subarea 1 are commercial (office and retail); these uses comprise about 90% of the total floor area in Subarea 1. Exterior noise levels (Ldn) generally exceed those considered "satisfactory" for these uses by the Plan for Transportation Noise Control (see Figure IV.J.1). Workers in older structures (built in the 1950's or earlier) with operable windows, are the most likely to be affected. Workers in newer buildings with fixed windows, or workers 10 stories or more above the ground/18/ probably hear little street noise.

Subarea 2

Street-level 24-hour Ldns range from about 71 dBA to 75 dBA in the East South of Market Subarea (see Table IV.J.2). Traffic noise in Subarea 2 is characterized by more rapidly moving traffic (reaching up to 35 mph between blocks) on wide one-way streets. Therefore, although Subarea 2 carries less traffic than does Subarea 1, individual vehicles make more noise. Noise from the James Lick Skyway is audible over local traffic noise generally within the area bounded by Second, Howard, Steuart and Folsom Sts. Howard, Folsom, Second and Third Sts. each carry three diesel bus lines, typically with 15 to 25 buses passing a particular point during the peak hour./19/ Construction noise is not a problem, however; no major construction projects are currently underway./16/

Commercial uses (office and retail) make up about 72% of the floor area in Subarea 2. These uses are exposed to noise levels which exceed the City's guidelines for "satisfactory" noise levels (see Figure IV.J.1). However, since most of these uses are in buildings less than about 30 years old, worker exposure to these noise levels is minimal. About 25% of the Subarea's floor area is industrial, warehousing or parking; these uses are comparatively noise-insensitive, and are compatible with the existing noise environment.

Subarea 3

Like Subarea 2, traffic noise in the Central South of Market Subarea is characterized by rapidly moving traffic on wide, one-way streets. Long blocks (long distances between intersections) and timed lights at intersections encourage traffic speeds of up to 35 mph. Subarea 3, along with Subareas 1 and 5, carries among the highest traffic volumes in the C-3 District. Street-noise levels (Ldn) range from about 72 dBA to 75 dBA.

Mission St. is a major source of diesel bus noise. Five lines, with 42 buses passing a single point during the peak hour, use Mission St. in this subarea./19/ Howard, Third, Fourth and Ninth Sts. each carry about 14 to 24 diesel buses during the peak hour./19/ Subarea 3, which contains most of Yerba Buena Center Redevelopment Area, currently has three buildings under construction./16/

Noise-insensitive uses, such as industrial, warehousing and parking, comprise about 50% of the floor area in Subarea 3. However, residential uses (transient hotels, residential hotels and housing) make up about 15%, a substantial amount. Much of the housing is in wood-frame buildings, containing few, if any, noise insulating features. Although this housing tends to occur along less noisy narrower side streets, away from the major one-way thoroughfares, 24-hour noise levels (Ldn) at these locations range from about 62 dBA to about 70 dBA. Light industrial uses, such as print shops, automotive repair, and building equipment maintenance shops, are interspersed with these residential uses, and occasionally generate intrusive noise. The wood-frame housing, as well as the residential hotels which occur along major thoroughfares (primarily Sixth St.), may occasionally experience annoying (although not unhealthful) interior noise levels.

Subarea 4

Traffic noise in the South Van Ness Subarea is dominated by two major streets, Market St. and Van Ness Ave. Street-level Ldns in the subarea range from 72 dBA to 75 dBA (see Table IV.J.2). Market St. carries four diesel bus routes at that point, with 32 buses passing by in the peak hour./20/ No buildings are currently under construction./16/

About 85% of the subarea's floor space is in commercial (office and retail) uses. Although exposed to 24-hour noise levels that exceed the City's "satisfactory" levels for those uses (see Figure IV.J.1), almost all of these uses are in recently constructed buildings likely to contain noise insulating features.

Subarea 5

The Tenderloin Subarea contains a comparatively wide range of traffic noise levels. Streets running north-south west of Powell St. have Ldns of 65 dBA to 70 dBA, generally less noisy than the C-3 District as a whole. Sutter, Geary, Sixth and Eighth Sts., however, have Ldns of 74 dBA or 75 dBA.

Major diesel bus routes through the subarea are on Geary, Market and Mission Sts., carrying 15, 32 and 42 buses during the peak hour, respectively./21/ One major hotel is under construction.

Residential uses (transient hotel, residential hotel and housing) make up the largest portion, 53%, of the floor space in Subarea 5. Although most of this occurs along the comparatively less noisy streets, an Ldn of 65 dBA still exceeds the City's guidelines for "satisfactory" noise exposure (see Figure IV.J.1). About 25% of the subarea's residential space is in residential hotels. These structures, generally built in the first half of this century, generally do not contain adequate noise insulation features.

Subarea 6

Twenty-four-hour Ldns in the Union Square Subarea range from 70 dBA to 74 dBA. Like to Subarea 1, Subarea 6 is characterized by high volumes of traffic traveling at low speeds.

Major diesel bus routes exist throughout the subarea, on Geary, Stockton, Market, Mission, Third and Fourth Sts. These streets carry 15, 33, 40, 42, 25 and 24 buses, respectively, during the peak hour./22/ Three office buildings are under construction./16/

Commercial uses (office and retail) make up 65% of the floor area in Subarea 6. The second major use is residential (primarily transient hotel), which comprises about 20% of the floor area. Although the commercial uses are exposed to noise levels that only slightly exceed the City's guidelines for "satisfactory" noise levels (see Figure IV.J.1), the residential exposure to an Ldn of 70 dBA or greater indicates that these uses, wherever they have inadequate noise insulation, are in an incompatible noise environment (see Figure IV.J.1).

Subarea 7

The Chinatown Subarea experiences street-level Ldns ranging from 70 dBA to 75 dBA. Although traffic generally moves slowly through this subarea, the steepness of its east-west running streets causes individual vehicles to generate substantially more noise han they do in more level areas of the City.

Although Stockton St. is the major diesel bus route through the subarea (with 33 diesel buses passing through in the peak hour/23/), peak-hour express buses (18 in the peak hour) going up the Pine St. hill between Kearny and the top of the Stockton Tunnel generate more intrusive noise. No major construction is currently underway./16/

About half (52%) of Subarea 7's floor area is commercial, although substantial portions are cultural/institutional and residential uses (23% and 22%, respectively). The cultural/institutional and residential uses, which largely occur in older buildings without special noise insulation features, are generally incompatible with their noise environment (see Figure IV.J.1).

IMPACTS

1990

New development between 1984 and 1990 would not generate enough new traffic to measurably increase traffic noise levels (see Table IV.J.2). The rate of building construction would be slightly less than it is currently; roughly 25 to 30 development projects would be under construction at any given time/24/, as compared with 30 to 33 currently./16/ Subarea 1 would receive about half of this construction. Thus, although construction noise effects would be less than they are now, Subarea 1 would continue to experience disruptive and intrusive noise levels near construction sites through 1990.

The rate of new construction would be greater in Subareas 5 and 6 than it is in 1984. Roughly five major buildings would be under construction at any given time in each subarea, compared with three currently./24/ Both of these subareas contain large proportions of residential uses (see Setting), which could be temporarily affected by this construction, depending on the location of both new construction and existing or new housing.

Muni peak-hour ridership would increase by an average of about 12% system-wide between 1984 and 1990 (see Section IV.E. Transportation and Circulation). Under the assumption that this new demand would be evenly distributed to all Muni lines, Muni might increase the frequency of its diesel bus service by about 12% to meet the demand. Although streets which currently carry the heaviest bus traffic, such as Market and Mission Sts., would likely also experience the greatest increases (about four more buses each in the

TABLE IV.J.2: DAY-NIGHT WEEKDAY NOISE LEVELS ALONG MAJOR C-3 DISTRICT STREETS, BY SUBAREA, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN

Location (Subarea and Street)	Projected Day-Night Noise Level (Ldn) (a) in dBA 1984	1990	Downtown Plan 2000
Subarea 1			
Clay	70	70	71
Sacramento	73	73	73
California (b)	75	75	76
Pine	75	75	75
Bush	75	75	76
Kearny	76	76	77
Montgomery	73	73	73
Sansome	72	72	72
Main (c)	75	75	76
Beale (c)	74	74	75
Mission	72	72	72
Market	73	73	74
Subarea 2			
Howard	75	75	76
Folsom	73	73	74
Second	71	71	72
Third	74	74	75
Subarea 3			
Mission	72	72	73
Howard	75	75	76
Third	74	74	75
Fourth	75	75	76
Fifth	74	74	75
Sixth	74	74	75
Seventh	72	72	73
Eighth	75	75	76
Ninth	75	75	76
Subarea 4			
Van Ness	75	75	76
Market	75	75	76
Mission	72	72	73
Ninth	75	75	76
Tenth	73	73	73

TABLE IV.J.2: DAY-NIGHT WEEKDAY NOISE LEVELS ALONG MAJOR C-3 DISTRICT STREETS, BY SUBAREA, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN (Continued)

	Projected Day-Night Noise Level (Ldn) (a) in dBA		
Location (Subarea and Street)	1984	1990	Downtown Plan 2000
Subarea 5			
Sutter	74	74	75
Post	71	71	72
Geary	74	74	75
Taylor	69	69	70
Market	73	73	74
Mission	72	72	73
Sixth	74	74	75
Seventh	72	72	73
Eighth	75	75	76
Subarea 6			
Sutter	73	73	74
Post	70	70	71
Geary	72	72	73
Stockton	71	71	72
Market	73	73	74
Mission	72	72	72
Third	74	74	75
Fourth	73	73	74
Fifth	73	73	74
Subarea 7			
Clay	70	70	71
Sacramento	73	73	73
California (b)	73	73	74
Pine	75	75	75
Bush	75	75	76
Stockton	71	71	72

(a) Ldn: an averaged sound level measurement based on human reaction to cumulative noise exposure over a 24-hour period. To account for greater annoyance, 10 dBA are added to measured noise levels between 10:00 p.m. and 7:00 a.m.

(b) California Street noise levels do not include noise from cable-car traffic. It is likely that cable-car traffic noise would increase the levels shown by less than 1 dBA.

(c) Noise levels shown are for street segments between Mission and Market Streets.

SOURCE: Environmental Science Associates, Inc.; using U.S. Department of Transportation, 1978, Highway Traffic Noise Prediction Model.

peak hour), these increases would not be as noticeable or annoying as the smaller increases along the lightly traveled routes. This is because the intrusiveness of noise depends not so much on its loudness as on how much it stands out from its background. Streets which could experience noticeably more intrusive noise, by subarea, include the following:

Subarea 1: Sansome St., Montgomery St.
Subarea 2: None
Subarea 3: Sixth St.
Subarea 4: None
Subarea 5: Sutter St., Post St.
Subarea 6: Sutter St., Post St.
Subarea 7: None

Pine St. in Subarea 7 would continue to be of concern. Although intrusive noise would not noticeably increase there between 1984 and 1990 (buses would continue to pass by about once every three minutes in the peak hour), individual buses would still generate up to 95 dBA accelerating uphill in a residential area.

Unless mitigated, background traffic noise levels would continue to be incompatible with new uses in the C-3 District. About 70% of the new development between 1984 and 1990 would be commercial (office and retail), which is considered moderately noise-sensitive, and about 30% of it would be residential (transient hotels and housing), which is considered very noise-sensitive (see Figure IV.J.1). All new hotel rooms and housing units would be required to be constructed in accordance with California State Noise Insulation Standards./25/ These standards require that wherever residential units/26/ are constructed in a noise environment which exceeds 60 dBA CNEL/27/ (a 24-hour noise level similar to Ldn), the units must include noise insulation features to reduce interior noise levels to 45 dBA CNEL. In addition, it is likely that new residential units in the C-3 District would be constructed above the ground floor, slightly reducing their noise exposure from the levels shown in Table IV.J.2./18/ The City's Plan for Transportation Noise Control/10/ recommends the inclusion of noise insulation features in all new uses incompatible with their noise environments (see Figure IV.J.1). It is likely, therefore, that downtown workers in buildings built between 1984 and 1990 would not routinely be exposed to excessive or disruptive indoor noise levels.

2000

New development between 1990 and 2000 would, in some cases, measurably affect traffic noise levels in the C-3 District (see Table IV.J.2). In no case would the increase exceed 1 dBA, a change undetectable to the human ear.

Muni ridership would increase by about 12% between 1990 and 2000 (see Section IV.E. Transportation and Circulation). The rate of new building construction would be less in the year 2000 than it would be in either 1984 or 1990. An average of about 10 to 15 buildings would be under construction in the C-3 District at any time between 1990 and 2000, as compared with about 25 to 30 buildings between 1984 and 1990. The potential effects of these changes and the compatibility of new land uses with the noise environment are discussed by subarea, below.

Subarea 1

Subarea 1 would experience slight, but not noticeable, increases in traffic noise along Clay, California, Bush, Kearny, Main, Beale and Market Sts. (see Table IV.J.2). Average 24-hour noise levels (Ldn) along all streets in Subarea 1 would exceed 70 dBA. Ldns along California, Bush, Kearny and Main Sts. would exceed 75 dBA. These noise levels would continue to be annoying, would continue to make street-level outdoor conversation almost impossible, and could contribute to long-term hearing loss/9,28/ in those not insulated from the noise during the working day (those who work outside, or who work near open windows near street level).

The intrusive effects of construction noise in Subarea 1 would be substantially less than they are now, or would be in 1990. Only about five buildings would be under construction at any given time./24/ Mission and Market Sts. could receive up to five additional diesel buses each during the peak hour, between 1990 and 2000. This would result in about 50 diesel buses passing a single point on both Mission St. and Market St. during the peak hour. Although very annoying to workers in buildings without adequate noise insulation along Mission and Market Sts., this would not likely be noticeably more intrusive than currently. Buses would pass by on an average of once every 1.2 minutes at peak times in 2000; currently they pass by about once every 1.4 minutes during peak periods. Similar to the 1990 case, those streets most likely to be affected by new diesel bus traffic are the comparatively less noisy ones, Montgomery and Sansome Sts. Buses which pass by on Montgomery St. once every eight minutes in 1984 could pass by once every six minutes in the year 2000 during peak times. Buses which pass by on Sansome St. once every 10 minutes in 1984 could pass by once every eight minutes in the year 2000.

The dominant land uses in Subarea 1 would continue to be commercial (office and retail); these would comprise about 90% of Subarea 1's total floor area. This new commercial space would not be compatible with Subarea 1's noise environment without some noise insulation (see Figure IV.J.1). In most cases, the necessary noise insulation could be achieved with standard high-rise steel-and-concrete construction and well-sealed fixed (double-pane) windows. To the extent that older, more noise-porous buildings are replaced by newer, noise-insulating structures, the total downtown population exposed to potentially hazardous noise levels could be reduced.

The Downtown Plan would encourage the construction of about 250,000 sq. ft. of new housing in Subarea 1 between 1990 and 2000. In addition, about 240,000 sq. ft. of tourist hotel space would be built. These uses are considered especially noise-sensitive (see Figure IV.J.1). The construction of new housing, in particular, in Subarea 1 would conflict with Objective 3, Policy 1 of the Plan for Transportation Noise Control (see Table IV.J.1). Although the requirements of the State Noise Insulation Standards/25/ (see discussion under 1990, above) would ensure that indoor noise levels be low enough to safeguard the health of the residents, open spaces, such as balconies and courtyards, which are required by the City Planning Code, would be largely unusable. Because some of the existing housing stock in Subarea 1 already has excessively noisy open space, the effect of the Downtown Plan would be to increase the residential population exposed to unpleasant noise levels in private open space. These effects could be alleviated by placement of open space away from streets (see Section V.J. Mitigation).

Subarea 2

Subarea 2 would experience slight, but not noticeable, increases in 24-hour noise levels on all its major streets. The 24-hour Ldn on Howard St. would exceed 75 dBA. Noise contributions from the elevated James Lick Freeway would cause the Ldn in portions of the area bounded by Second, Howard, Steuart and Folsom Sts. to approach 80 dBA. This area would be the noisiest (on a 24-hour-averaged basis) in the C-3 District.

Construction noise would be noticeably greater and more intrusive than it would be in either 1984 or 1990. An average of about three to four buildings would be under construction simultaneously at any given time between 1990 and 2000, compared with only one at a time between 1984 and 1990, and none currently./24/ Since Subarea 2 is a comparatively small subarea, workers there could be disrupted on a regular basis by noise from more than one construction site at the same time.

Although diesel bus traffic would likely increase by about 12% between 1990 and 2000 on Howard, Folsom, Second and Third Sts., all of these streets would already have (in 1990) buses passing by from about once every four minutes to about once every two minutes during peak periods; intrusive noise would likely not be noticeably affected.

About 90% of the new space built in Subarea 2 between 1990 and 2000 would be commercial (office and retail). This new space would generally replace industrial, warehousing and parking uses, which are less noise-sensitive. Although this would conflict with Objective 3, Policy 1 of the Plan for Transportation Noise Control (see Table IV.J.1), current high-rise office construction techniques (see discussion under Subarea 1, above) would generally be sufficient to reduce interior noise to acceptable levels. The exception would be those buildings overlooking, and within about 250 ft. of the elevated James Lick Freeway. Special construction techniques (such as use of sound absorbing insulation) would likely be necessary here.

No new housing would be constructed in Subarea 2, but 225,000 sq. ft. of new tourist hotel space is projected to be built there. This hotel space would be incompatible with the noise environment, but would have acceptable interior noise levels because of its required compliance with State Noise Insulation Standards./25/

Subarea 3

Subarea 3 would experience slight, but generally unoticeable, increases in 24-hour noise levels (Ldns) along all of its major streets (see Table IV.J.2). Street-level Ldns would exceed 72 dBA on all of these streets, and would exceed 75 dBA on Howard, Fourth, Eighth and Ninth Sts.

No more than one building would be under construction at any given time between 1990 and 2000, on the average./24/ Intrusive construction noise levels would thus be less than they are now, but about the same as those between 1984 and 1990.

Diesel bus noise would remain intrusive, but not noticeably changed, along Mission, Howard, Third, Fourth and Ninth Sts. Diesel bus noise along Sixth St., which has a concentration of residential uses, would likely become noticeably more intrusive. Buses pass about once every six minutes in 1984, but would pass once every four to five minutes in the year 2000.

Commercial space (75% of the new floor area between 1990 and 2000) and residential space (tourist hotels and housing, 25% of the new floor area) would replace noise-insensitive industrial, warehousing and parking uses in Subarea 3. Of particular concern would be the new housing (about 45,000 sq. ft.) and any open space associated with it. Residents in any housing which might be constructed at street level along the major streets in Subarea 3 (see Table IV.J.2) could experience annoyance and the feeling that the housing is not in a tranquil area. If this housing were built primarily along the alleys that bisect many of Subarea 3's blocks, and replaced industrial uses which are intermixed with existing residential uses there, the noise environment there could be improved. In addition, traffic noise levels would be about 5 to 10 dBA less along these alleys, than along the major streets. Replacement of the industrial uses in a residential area would be consistent with Objective 3, Policy 2, of the Plan for Transportation Noise Control (see Table IV.J.1). The Downtown Plan, by excluding housing from Floor Area Ratio (FAR) requirements in Subarea 3, would offer the possibility of constructing new housing in these comparatively quiet areas in Subarea 3, rather than in Subareas where all streets are relatively noisy.

Subarea 4

The noisiest streets in Subarea 4 would continue to be Market St. and Van Ness Ave. Both of these streets would have Ldns of about 76 dBA in the year 2000 (see Table IV.J.2), about 1 dBA higher than present levels. A building would be under construction in the subarea only about half the time, on the average, between 1990 and 2000. Diesel bus noise, already intrusive along Market St. (see Setting), would not be noticeably more intrusive by the year 2000.

About 90% of the new floor space built in Subarea 4 between 1990 and 2000 would be commercial (office and retail). The remaining 10% would be housing. The commercial space, although incompatible with the noise environment there (see Figure IV.J.1), could easily be constructed to minimize potential effects on the occupants. Any housing, with its associated open space, constructed below about the tenth story/18/, could be incompatible with existing noise levels (see Figure IV.J.1); residents could feel that they were not living in a tranquil environment. Although the existing requirements of the State Noise Insulation Standards/25/ would ensure that indoor noise levels were low enough for residential use, associated outdoor areas would be adversely affected by noise levels similar to today's noise levels. These effects could be alleviated by placement of open space away from streets (see Section V.J. Mitigation).

Subarea 5

The Tenderloin Subarea would continue to contain areas less noisy than the C-3 District as a whole. These areas would be near the north-south running streets west of Powell St., which would have Ldns of 70 dBA or less. Sutter, Geary, Market, Sixth and Eighth Sts. would be measurably (but not noticeably) louder than they are currently, with Ldns of about 75 dBA.

The rate of new building construction would be about the same as in 1984 and 1990: between 1990 and 2000, an average of two to three buildings would be under construction simultaneously in Subarea 5. Perceived intrusive noise would likely noticeably increase along Sutter and Post Sts., which go through residential portions of Subarea 5. Diesel bus traffic could increase from about one every nine minutes in 1984 to about one every seven minutes in the year 2000.

New development in Subarea 5 would be almost evenly split between commercial and residential uses. The commercial space would likely be adequately insulated with current construction techniques. The residential uses would primarily be new hotel space. The requirements of the State Noise Insulation Standards/25/ would ensure that the indoor noise levels of hotel rooms and residential units would be compatible with residential use. Open space associated with new housing, however, would be incompatible, unless built at the tenth story or higher/18/, or built away from the streets (see Section V.J. Mitigation). The Downtown Plan, by excluding housing from Floor Area Ratio (FAR) requirements in Subarea 5, could encourage the construction of new housing in the residential portions of Subarea 5 which are comparatively quiet relative to other Subareas.

Subarea 6

The Union Square Subarea would be affected by 24-hour traffic noise levels (Ldns) of 71 dBA to 75 dBA, only slightly noisier than currently. Similar to Subarea 5, potential new diesel bus traffic along Sutter and Post Sts. could noticeably affect perceived intrusive noise there.

Intrusive nose from building construction would likely be less than in 1984 and 1990. No more than one building, on the average, would be under construction at any time between 1990 and 2000 (compared with three in both 1984 and 1990)./16,24/

About 68% of the new construction between 1990 and 2000 in Subarea 6 would be commercial (mostly retail), and 32% would be tourist hotel space. No new housing would be built. Although the commercial and hotel space could easily be adequately insulated with current construction techniques, the exterior attractiveness of the new retail space for shopping and eating could be adversely affected. This would be particularly true for small, street-level, retail spaces and restaurants, which depend on their ability to attract pedestrians.

Subarea 7

The Chinatown Subarea would continue to experience traffic noise levels comparable to those of more densely developed portions of the C-3 District (see Table IV.J.2), because Chinatown is hilly and contains major cross-town routes (Pine, Bush and Stockton Sts.).

Relatively little new construction would occur in Subarea 7 between 1990 and 2000; about 90% of the time between 1990 and 2000 no new buildings would be under construction./24/ Noise from diesel buses along Pine St. would continue to be intrusive (see Setting), but there would likely be no noticeable increase in the frequency of these buses between 1984 and 2000.

About 50,000 sq. ft. of new housing, and a roughly equal amount of new office space would be constructed in Subarea 7 between 1990 and 2000. The new housing and associated open space would be incompatible with noise levels there (see Figure IV.J.1), possibly causing some residents to feel that they did not live in a tranquil area. The requirements of the State Noise Insulation Standards/25/, however, would ensure that indoor noise levels would not be adversely affected. Because comparatively low height limits and floor area ratios (see Section IV.B. Land Use and Real Estate Development) would generally preclude new housing above the tenth story, openable windows and residential open space would have to be substantially shielded from traffic noise (see Section V.J., Mitigation) to avoid adverse effects experienced by existing housing there.

NOTES - Noise

/1/ U.S. Environmental Protection Agency, Office of Noise Abatement and Control, March 1974, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA-550/9-74-004.

/2/ The exception is the extraordinarily loud intrusive noise, such as an explosion, which can rupture an ear drum. Since noise of this magnitude would rarely (if ever) occur in the C-3 District, the discussion of intrusive noise for the remainder of this section refers only to those noises which would not cause permanent hearing loss.

/3/ Marilyn K. Hutchinson, M.D., Ed., U.S. Department of Health, Education and Welfare, 1976, A Guide to the Work-Relatedness of Disease.

/4/ Marcus M. Key, et. al., Ed., U.S. Department of Health, Education and Welfare, June 1977, Occupational Diseases - A Guide to their Recognition.

/5/ Sheldon Cohen, et. al., "Cardiovascular and Behavioral Effects of Community Noise," American Scientist, Volume 69, September-October, 1981.

/6/ E.A. Peterson, et. al., "Noise Raises Blood Pressure without Impairing Auditory Sensitivity," Science, Volume 211, March 27, 1981.

/7/ The "A-weighted" scale simulates the frequency response of the human ear. A "B-weighted" scale and "C-weighted" scale also exist, with differing frequency sensitivities.

/8/ Measured noise levels (in dBA) are logarithmically averaged over a 24-hour period. To account for the greater annoyance of nighttime noise, 10 dBA are added to measured noise levels between 10:00 p.m. and 7:00 a.m.

/9/ The 70 dBA Ldn was identified by the EPA as the level that would result in hearing loss after exposure for 40 years.

/10/ City and County of San Francisco, Department of City Planning, September 1974, Plan for Transportation Noise Control, Environmental Protection Element of the Comprehensive Plan, adopted by San Francisco City Planning Commission Resolution No. 7244.

/11/ Fifteen-minute noise measurements were made at 11 locations in the C-3 District during the evening peak period on Wednesday and Thursday, December 14 and 15, 1983. The measurements, and a map showing the locations, are available for review at the Office of Environmental Review, Department of City Planning, 450 McAllister St., Fifth Floor. A metrosonics Inc., Metrologger (model db-306A) sound level meter, calibrated before both sets of measurements was used.

NOTES - Noise (Continued)

/12/ The 24-hour traffic adjustments and Ldn calculations are available for review at the Office of Environmental Review, Department of City Planning, 450 McAllister St., Fifth Floor.

/13/ Subareas 1, 3 and 5 carry similarly high traffic volumes, see Table IV.E.4 in the Transportation and Circulation Section.

/14/ The lines are SamTrans, 26 Valencia, 13 Guerrero, 14 Mission Limited and 14 Mission Express, according to San Francisco Municipal Railway (Muni), August 1983, San Francisco Street and Transit Map.

/15/ The lines are 2 Clement, 9 San Bruno, 66L Quintara Limited, 71 Haight-Noriega and 31 Balboa.

/16/ Department of City Planning records as of September 1983; Department of City Planning, 450 McAllister St., Fifth Floor.

/17/ D.N. May, Ph.D., 1978, Handbook of Noise Assessment, Van Nostrand Reinhold Environmental Engineering Series, p. 211.

/18/ Street noise decreases about 5 dBA for every 10 stories above the ground.

/19/ The lines are Golden Gate Transit, 12 Folsom, 42 Downtown Loop, 15 Third, 30X Freeway Express, 17X Parkmerced Express, 81X Gateway Express, 19 Polk and SamTrans.

/20/ The lines are 9 San Bruno, 26 Valencia, 66L Quintara Limited and 71 Haight-Noriega.

/21/ The lines are 38 Geary, 38L Geary Limited, 9 San Bruno, 26 Valencia, 66L Quintara Limited, 71 Haight-Noriega, SamTrans, 13 Guerrero, 14L Mission Limited and 14X Mission Express.

/22/ The lines are 38 Geary, 38L Geary Limited, 30X Freeway Express, 30AX Freeway A-Express, 30BX Freeway B-Express, 2 Clement, 9 San Bruno, 66L Quintara Limited, 71 Haight-Noriega, 31 Balboa, SamTrans, 26 Valencia, 13 Guerrero, 14L Mission Limited, 14X Mission Express, 15 Third, 17X Parkmerced Express and 81X Gateway Express.

/23/ The lines are 30X Freeway Express, 30AX Freeway A-Express, and 30BX Freeway B-Express.

/24/ Based on an assumed two-year construction period for each building.

/25/ Title 25, Chapter 1, Subchapter 1, Article 4, of the California Administrative Code.

/26/ All residential uses except single-family, detached dwellings.

/27/ CNEL: the Community Noise Equivalent Level, which is similar to Ldn except that sound level measurements taken between 7:00 p.m. and 10:00 p.m. are weighted 5 dBA higher than daytime sounds, in addition to the 10 dBA 10:00 p.m. to 7:00 a.m. weighting. In practice, CNEL and Ldn rarely differ by more than 2 dBA.

/28/ "Long-term" is meant here to be about 40 years. Gradual, incremental hearing loss would occur over the entire period. Depending on the individual and the exposure, noticeable hearing damage could occur more quickly or more slowly than over 40 years.

K. SEISMIC SAFETY

SETTING

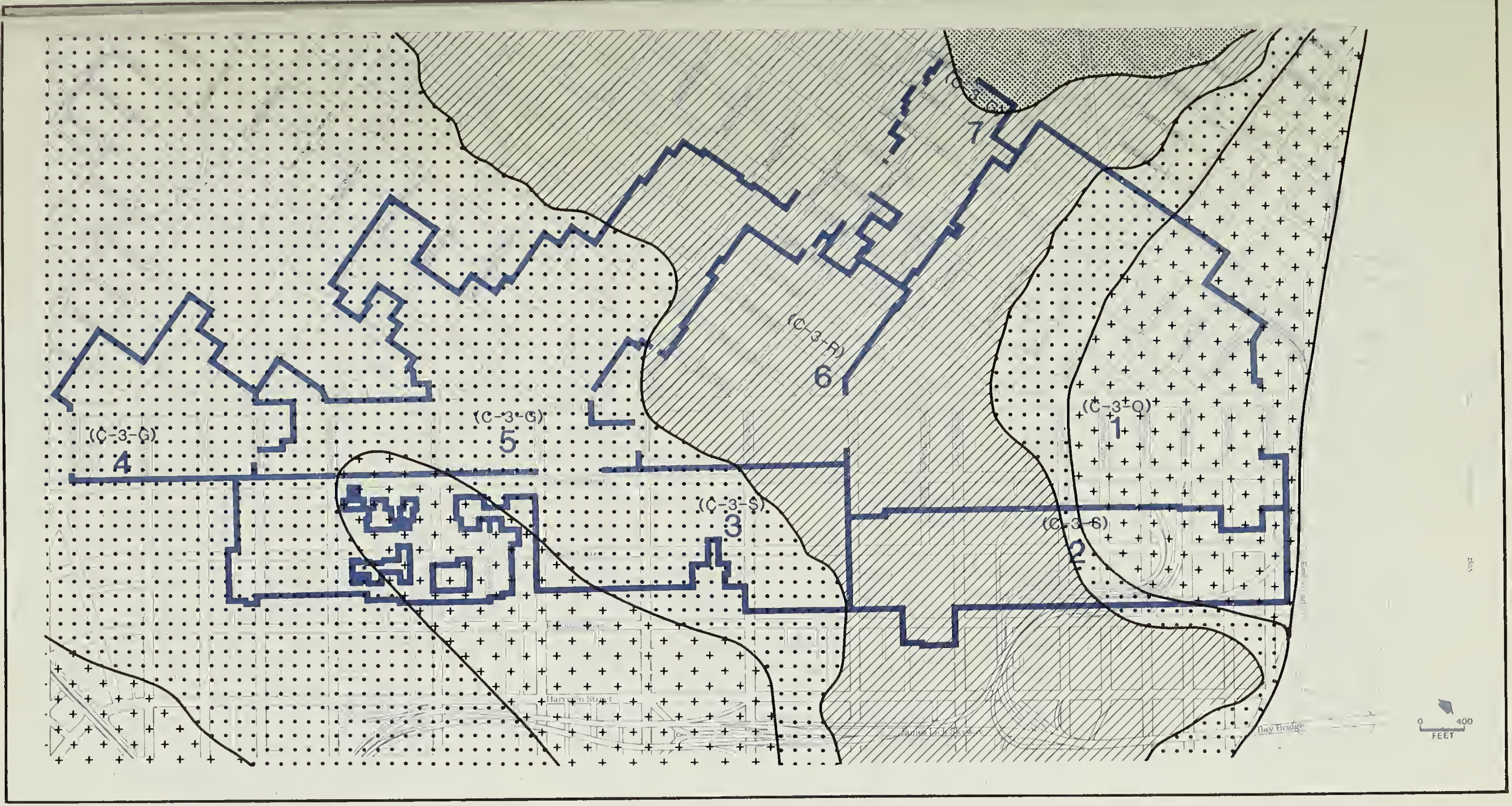
Faults

No active faults are known to exist within the City of San Francisco, but several active faults are nearby, and could affect existing and proposed structures within the Downtown Study Area./1/ The active faults include the San Andreas Fault, about nine miles southwest of downtown; the Hayward Fault, about 15 miles east of downtown, and the Calaveras Fault, about 30 miles east of downtown.

Both the San Andreas and Hayward Faults have recent histories of major and minor movements. Historically, at least one 'great' earthquake of the magnitude of the 1906 San Francisco earthquake (Richter magnitude 8.3 /2/) can be expected to affect downtown San Francisco on an average of approximately every 125 years, though estimates of recurrence intervals vary./3/ As it has been 77 years since the 1906 earthquake, it is appropriate to consider that another great earthquake can occur on the northern San Andreas fault sometime in the next several decades./4/ A major earthquake of approximately Richter magnitude 7.5 also could occur on the Hayward Fault during this time period. It's likelihood of occurence is similar to that of an earthquake on the San Andreas Fault. An earthquake on the Calaveras Fault could have a shock of up to magnitude 7.3 on the Richter Scale./5/ Several small and moderate earthquakes, comparable to or smaller than the 1957 Daly City earthquake (Richter 5.3), may also be expected to affect downtown.

It has been estimated that earthquakes of magnitudes 7.5 to 8.3 on the San Andreas or Hayward Faults could result in $38 to $55 billion in property damage regionally and, depending on time of day of occurence, from 3,000 to 11,000 dead and 12,000 to 44,000 hospitalized (these estimates from the Federal Emergency Management Agency are stated as being uncertain by a possible factor of two to three)./6/

Several inactive faults exist within the City. These include the San Bruno Fault and the City College Fault Zone, about six and five miles southwest of downtown, respectively./7/ In addition, several smaller inactive faults or shear zones are located near Telegraph Hill, Potrero Point, and the James Lick Freeway. Because these faults are inactive, none of them are likely to result in earthquakes that would affect the downtown area.



+ VIOLENT (Fairly general collapse of brick and frame structures unless unusually strong)

⁚ VERY STRONG (Occasional collapse of masonry and frame structures)

▨ STRONG (Cracks in masonry general collapse of brick chimneys)

▩ WEAK (Occasional fall of brick chimneys and plaster)

NOTE: Use Districts and Subareas shown in blue.

FIGURE IV.K.1:
ESTIMATED DOWNTOWN GROUNDSHAKING INTENSITIES IN A MAJOR EARTHQUAKE

SOURCE: URS / John A. Blume

Groundshaking

Groundshaking intensities that would result from a major earthquake have been projected for the City of San Francisco by URS/John Blume and Associates (see Figure IV.K.I, p. IV.K.2)./8/ Groundshaking in San Francisco has been classified on a five-point scale ranging from A (very violent) through E (weak), based on the amount of damage that would be caused by groundshaking in an earthquake with a Richter magnitude of 8.3. Downtown San Francisco has no areas in which "A"-rated (very violent) groundshaking would occur.

"B"-rated (violent) groundshaking would occur on the southern and eastern edge of downtown, primarily in the eastern third of the Subarea 1 and the northeastern third of Subarea 2 (see Figure IV.K.1, p. IV.K.2. In addition, groundshaking would be "violent" in the middle of Subarea 3, near Seventh and Howard Streets. These areas, underlain by unconsolidated muds and artificial fill material, were the sites of some of the heaviest groundshaking damage that occurred in the 1906 earthquake. "Violent" groundshaking would cause general collapse of moderately strong brick and frame buildings, serious cracking of stronger buildings, and lateral displacement of streets, bending of rails, and ground fissuring. Properly founded steel-framed buildings constructed to the seismic safety specifications of the San Francisco Building Code would suffer the least damage in the event of violent groundshaking, while unreinforced brick structures built before 1948, the year that the City's first seismic safety building requirements were incorporated in the Building Code, would be most susceptible to heavy damage or collapse.

"Very strong" (C) groundshaking would occur in all of Subarea 4 and most of Subarea 3. The central parts of Subareas 1 and 2, which would also receive very strong groundshaking, are underlain by unconsolidated sands and clays. While these materials are not as susceptible to failure as are artificial fills, they may intensify seismic shaking and may fail. This very strong groundshaking would badly crack masonry structures, resulting in the collapse of some of them. Improperly founded wood-frame buildings would lurch and some of them would collapse. As above, pre-1948 buildings would suffer the greatest damage, although damage to specific structures would depend on their particular engineering characteristics.

"Strong" (D-rated) groundshaking would occur in the western third of Subarea 1, as well as most of Subarea 6, almost all of Subarea 7, and small portions of Subareas 3 and 5. "Strong" groundshaking would cause general, but not universal, fall of brick chimneys and cracks in masonry and brickwork. Because of the large number of unreinforced masonry structures in Subareas 3, 5, 6 and 7, "strong" groundshaking would cause considerable damage in these areas.

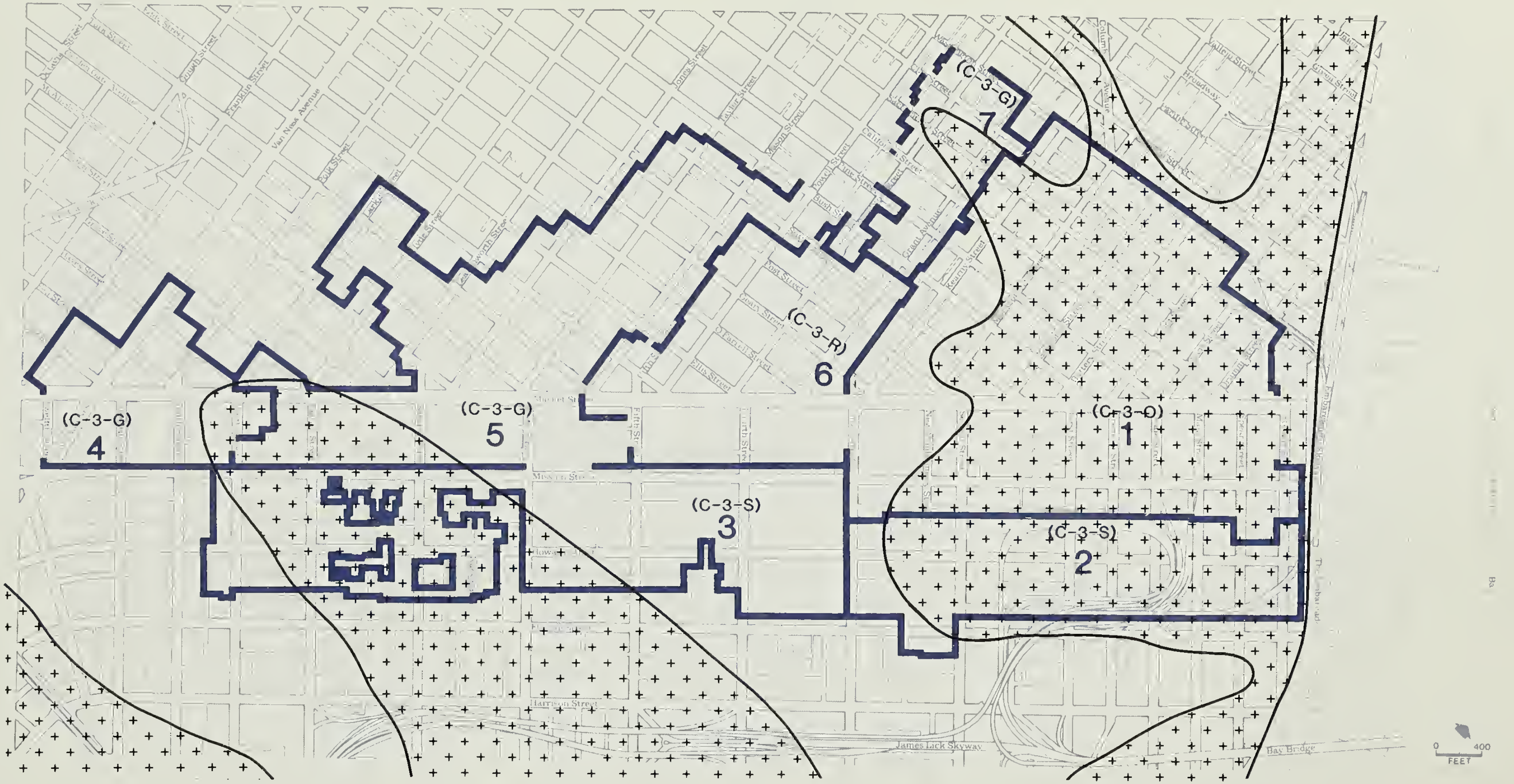
The extreme northeastern edge of Subarea 7 is rated E, "weak" groundshaking. This area is situated on bedrock, which does not amplify groundshaking and would not be likely to fail in an earthquake. "Weak" groundshaking would cause occasional fall of brick chimneys and plaster.

It should be noted that, in an earthquake of the magnitude of the 1906 earthquake, "virtually every building [in San Francisco] would be expected to have some damage visible to a trained observer"/8/ In addition, groundshaking resulting from large or moderate (Richter magnitude 5.5-8.5) earthquakes in the vicinity of the City could topple unattached interior objects, such as bookcases and furniture, and break or dislodge some windows, exterior panels, or cornices. Toppling interior objects could injure workers inside existing buildings; falling windows and facade material would be a hazard to pedestrians and vehicular traffic.

First-hand, accounts of personal experiences in major earthquakes are presented in Appendix P.

Subsidence and Liquefaction /9/

Areas of downtown susceptible to subsidence completely overlap those susceptible to liquefaction (see Figure IV.K.2, p. IV.F.5)./9/ This is because both are most likely to occur in areas underlain by soft sands and muds, unconsolidated, undifferentiated fills and high groundwater tables. All but the westernmost edge of Subareas 1 and 2 are mapped as susceptible to liquefaction and subsidence. A portion of Subarea 7 centered near Grant Avenue and Stockton Street is also susceptible to these hazards. Much of the southwest area of downtown, including most of the area bounded by (1) Mission, Folsom, Fifth, and Eighth Streets, and (2) Market, Mission, Seventh, and Ninth Streets, is susceptible to these phenomena.



▨ AREAS SUSCEPTIBLE TO LIQUEFACTION AND SUBSIDENCE

FIGURE IV.K.2:
DOWNTOWN AREAS SUBJECT TO
LIQUEFACTION AND SUBSIDENCE

NOTE: Use Districts and Subareas shown in blue.

SOURCE: URS / John A. Blume

If liquefaction or rapid subsidence were to occur downtown, buildings could settle and crack, and water mains, pipes, and underground utilities could break, leaving portions of the affected area without water, power, or telephone services. Elevators could be made inoperable because of loss of power or damage to the elevator system. Local streets could buckle or crack from lateral landsliding that might accompany liquefaction or rapid subsidence.

Buildings that would likely receive the greatest damage from liquefaction or subsidence include older structures with poor foundations. These are concentrated in Subareas 2, 3, 5, and 7. Modern high-rise structures, such as those concentrated in the Subarea 1, generally are founded on pilings driven fifty to one hundred feet or more into the underlying layers, or on thick concrete slabs that 'float' on a layer of engineered fill or on layers of soil beneath those most susceptible to failure. Both of these foundation types are engineered to support the structure in the event of ground failure resulting from liquefaction or subsidence.

Subsidence and liquifaction resulting from seismic shaking as well as the shaking itself, would also affect infrastructural elements including highways, bridges, utilities, and piers./7/ Some roads in the susceptible areas may become impassable because of cracking from subsidence and liquefaction, while others, particularly in Subarea 1, would be impassable because of fallen glass and debris. In the event of a 1906-magnitude earthquake, the San Francisco Bay Bridge is projected to be closed for over three days because of subsidence and liquefaction on the east approach, and possible failure of the elevated approach structures in San Francisco./7/ The Golden Gate Bridge would also be closed because of impassable appoaches. The downtown freeway system (James Lick Freeway and Highway 101) would also be closed for over three days because of ground failure./7/ The Southern Pacific/Caltrain commuter station and commute line would be closed, as would Muni. These closures would result from a combination of ground failure, power outages, and debris-blocked tracks and streets./8/ Port facilities adjacent to Downtown are likely to remain usable for emergency operations, but transport of people and supplies from the Port to various downtown locations would be impaired by closed streets./7/

Communication systems within San Francisco would be at or under 25% of full system effectiveness for over three days after a major earthquake, and total restoration of service would take considerably longer. Public safety circuits should remain generally serviceable./7/ Potrero and Hunters Point power plants would be shut down for an indefinite period. "In the congested portions of San Francisco ...., the power outage should be considered at 100% for 24 hours, and thereafter at 75% for an additional 24 hours."/10/ All standby generating facilities would be needed.

Because of the complexity of underground utility lines, and liquefaction and subsidence potential, Subareas 1 and 2 would be susceptible to total power outages for longer periods. The relatively more congested condition of these subareas would further hamper restoration of services.

Tsunamis

Projected tsunami runup in the waterfront area of downtown is 5 to 5.5 feet (above mean sea level (MSL)) for the 100-year event and 8.4 to 9.7 feet (MSL) for the 500-year event./11/ Elevations in the easternmost parts of Subareas 1 and 2 (east of Fremont and Battery Streets) are between eight and ten feet (MSL); lower portions of these subareas could be subject to flooding in the 500-year event. This flood would be unlikely to affect most structures, as most have slightly elevated bases. No other portions of downtown would be subject to flooding from tsunamis.

Emergency Services /12/

San Francisco maintains an Office of Emergency Services, which is charged with developing, coordinating, and informing the public about emergency response plans in case of a disaster in the City. The Office of Emergency Services has developed an Emergency Operation Plan which establishes priorities for government organizations dealing with disasters. The Office also advises and consults with the private sector on emergency plans within individual buildings. The Earthquake Response Element of this plan divides the City into ten Earthquake Response Districts, generally following San Francisco Fire Department Battalion Districts. The Battalion Fire Chiefs for each district are charged with implementing plans contained in this Element.

The Earthquake Response Element establishes locations for mass care facilities, casualty care facilities, casualty collection points, and multi-purpose staging areas. Mass care facilities would be administered by the Red Cross, and would provide shelter, food, and some clothing to victims of a major disaster. These facilities would also have emergency communication facilities, and would be coordinated from the Emergency Operations Center on Turk Street. Casualty care facilities are a network of hospitals, clinics, and aid centers that exist or would be set up to treat injuries. Casualty collection points are designated helicopter pick-up points from which the injured would be transported to the casualty care facilities. The multi-purpose staging areas are sites where aid from outside the City or affected district would be assembled.

Personnel assigned to each facility or area are expected to be on duty within three to twelve hours after an earthquake, though some of these people would be unable to get to their posts because of disruptions of transportation facilities and injuries. The Fire Department's first priority would be to conduct rescue operations in the most seriously affected areas.

The City has no general policy or plans to evacuate people from downtown to other areas during an earthquake. This is because a major earthquake would affect the entire Bay Area. In addition, egress from the City would be severely restricted. The Office of Emergency Services has developed plans to evacuate residents of the Tenderloin (parts of Subareas 5 and 6) and Chinatown (Subarea 7) to other parts of the City. These are areas with high population concentrations (up to 20,000 people per square mile) and many unreinforced masonry structures (the type of structure most susceptible to earthquake damage). Evacuation plans have also been developed for areas that would be in the floodplain of reservoirs in the City, should the reservoirs be ruptured in an earthquake. Evacuation would also be undertaken, if necessary, in the event of a major fire.

The City Office of Emergency Services would coordinate all emergency efforts with the State Office of Emergency Services, Red Cross, California Highway Patrol, Governor's Office, and other public and private agencies.

IMPACTS

Introduction

In order to assess potential seismic impacts upon projected downtown development in 1990, and upon development forecast for 2000 under the Downtown Plan, the following variables must be considered:

- geologic conditions;
- building types, foundations, and construction methods;
- building locations;
- intensity of earthquake;
- frequency and duration of shaking;
- time of day of earthquake; and
- weather conditions at time of earthquake.

In downtown San Francisco, geologic conditions are known, and intensity, frequency, and duration of a major (Richter magnitude 8+) earthquake can be assumed to be similar to the 1906 earthquake (although it should be noted that no two similar major earthquakes of similar magnitude produce identical damage profiles)./10/ Weather conditions, which could affect landsliding and ground failure, are not crucial factors in downtown San Francisco, except with respect to their effect on the number of people on the sidewalks.

The time of day of an earthquake could greatly affect the number of casualties downtown by affecting the number of people in downtown, and the number of people outdoors who could be struck by falling glass and debris. It has been estimated that about 50 out of every 100,000 residents of the City would die if an 8.3 magnitude earthquake were to strike at about 2:30 a.m./10,13/ The fatality ratio would be higher in areas with large masonry residential structures, and lower in areas with small wood frame structures. This is because large (10+ units) old masonry residential buildings would be more likely to collapse than small wood frame buildings. The city-wide fatality ratio for a similar earthquake at about 2:30 p.m. would be about 130 people per 100,000./10,13/ The ratio for congested areas such as downtown San Francisco is estimated at about 500 people per 100,000./10,13/ The primary causes for the projected higher fatality rate in downtown during working hours are falling parapets, glass and cladding; the concentration of people on the streets and sidewalks; the potential for damage or collapse of older structures; and the inability of medical teams to reach parts of this area because of fallen glass and debris.

In order to project seismic effects in the downtown study area, the following assumptions have been made: new structures would replace older structures built to less stringent Codes and more likely to collapse or suffer major damage/14/; taller buildings would pose greater seismic hazards than lower buildings of similar design and construction, because of greater swaying motion and surface material available for displacement; most old buildings that would be retained and preserved would not be brought up to current safety standards/15/; and the seismic event would occur during working hours./16/

Codes, Plans, and Policies

The City of San Francisco Building Code includes a number of design standards to ensure that new buildings are constructed with earthquake-resistant design and materials./17/ These requirements are among the most stringent in the U.S. However, it should be noted that " . . . the sole reliance on building codes, without judgment, [for estimating of damage] will lead to erroneous results, normally underestimating casualties and dollar losses . . . /10/ In addition, the response of buildings and structures to earthquake ground motions are not as well understood as some persons might expect. Surprises have occurred in every destructive earthquake. . . . [therefore] the expected seismic performance of any particular building can be stated in only a probabilistic sense."/10/

The seismic specifications of the Building Code of the City of San Francisco are intended to ensure that buildings that conform to its standards will not collapse in an earthquake of magnitude 7-8 on the Richter Scale, depending on building type and location. Responses of buildings designed to San Francisco's Building Code Standards to an earthquake of magnitude 8.0 or greater on the Richter Scale is not known./17/

In December 1983, the San Francisco Board of Supervisors adopted the 1979 Uniform Building Code with seismic amendments pertaining to the construction of wood-frame houses. This Building Code contains more stringent seismic design specifications than the 1975 San Francisco Building Code, which it replaced on January 2, 1984. This new Code is intended to prevent buildings built to its specifications from collapsing in an earthquake of the magnitude of the 1906 San Francisco Earthquake (Richter Magnitude 8.3)./18/ Several amendments to this Code were proposed by the Bureau of Building Inspection but were not approved by the Board of Supervisors. These included revising the method for calculating earthquake lateral forces to more closely fit the shaking characteristics, or periods, of certain types of buildings than methods presented in the UBC, strengthening requirements for corner column design, adding restrictions on reinforced concrete-frame buildings; considering the impact of cladding, if any, on modelling seismic safety of buildings, and other technical revisions. According to the Deputy Superintendent of the Bureau of Building Inspection, these revisions may become part of a later revision of the Uniform Building Code./18/ All buildings in San Francisco that receive Building Permits after January 2, 1984 will be subject to the 1979 Uniform Building Code, as amended.

The San Francisco and Uniform Building Codes are designed to confine earthquake damage to the following levels: 1) in a small earthquake, (approximately Richter magnitude 4.5 or less), no structural or non-structural (cladding, windows, etc.) damage would occur; 2) in a moderate earthquake (approximately Richter magnitude 4.5-7.0) extensive non-structural damage would occur, but little or no structural damage would occur; 3) in a major earthquake (Richter magnitude 7.0 to 8.3, the largest expected earthquake on the San Andreas Fault), structural damage would occur, but there would be no loss of life due to this damage. The third level of damage allows for design and construction of buildings from which considerable amounts of cladding and glass could fall to the streets. This falling debris could result in injury or death to pedestrians on the streets below.

The Board of Supervisors also has enacted a parapet ordinance designed to reduce the danger of injury to pedestrians from falling parapets. This ordinance requires reinforcing or removing dangerous parapets and cornices from certain designated buildings. Because of their weight, and because they are attached to buildings on only one side, unreinforced parapets would be likely to be the first objects to fall from a building in an earthquake. Parapet removal and renovation is progressing, and about one-half of the 2,000 property owners notified have removed or reinforced their parapets in accordance with the ordinance./17/

1990 Impacts

Between 1984 and 1990, about 41,000 workers would be added to the C-3 District (see section IV.C., Business and Employment). If a major earthquake occurred during working hours, these additional employees would likely have to be accommodated in San Francisco, regardless of their actual place of residence, for the three days in which the transportation systems may be unusable. Most of this growth (65.8% or 26,900 people) would occur in Subarea 1, much of which is on poorly consolidated fills and sands, which are highly susceptible to failure in a major earthquake (see Figure IV.K.2, p. IV.K.5). However, most new buildings would be more earthquake-resistant than the buildings which they would replace, so seismic hazards due to structural failure would be likely to be reduced./14/ In addition, most would be constructed on pile or floating mat foundations, and all would be designed and constructed to existing code standards.

The addition of about 26,900 workers to Subarea 1 would increase the number of people who could be injured by falling objects during an earthquake. The worker population would be increased from an already high 760 employees per acre (epa) to about 895 epa (this is equivalent to 573,000 persons per square mile, almost twice the average for the C-3 district as a whole). This would substantially increase the number of workers in the City's already dangerously congested office core. Residential square footage would increase from 162,000 sq. ft. to about 505,000 sq. ft., mostly in new high-rise structures. The new buildings would reduce the risk of injury by falling parapets, but could increase the risk of injury or damage from falling glass and cladding. The greater surface areas of the new buildings would increase the amount of siding materials available to fall to the street; the actual loss of such materials would depend on the materials and attachment methods used, but would add to the already substantial hazards from falling objects. In addition, should an earthquake occur during business hours, more emergency services would be required to care for these people than at present.

Subarea 2, with about 5.7% of the projected growth (2,340 persons), also consists generally of older buildings and has poor soil stability. Employee density is projected to rise from about 280 epa (1984) to about 315 epa (1990). This ten percent increase in worker density would result in more traffic in the area. This would create slightly worse emergency access conditions and a slightly higher number of potential injuries. In addition, housing in this subarea would be increased from 12,000 sq.ft to over 340,000 sq.ft, increasing the number of 24-hour residents in this area. Assuming foundations are stable, and engineering and construction are of high quality, the new buildings should not collapse or be severely damaged by liquefaction, which caused considerable damage in this area in the 1906 earthquake. Pile foundations, if properly engineered, should adequately support new structures./19/ Floating mat foundations, if properly engineered, would be likely to provide adequate support, but could tilt under liquefaction or severe ground shaking./20/ Additional structures to be built before 1990 are likely to be safer than existing buildings, but would result in a reduction in overall seismic safety because more glass and cladding materials being available to fall to the street.

Subareas 3 and 4 are projected to show little growth in resident or worker populations from 1984 to 1990. Little change in seismic safety from setting conditions would be likely to occur.

Most of Subarea 5, which would receive about nine percent of the projected downtown employment growth from 1984 to 1990, is less densely populated during the working day (employee densities would increase from about 185 epa to 210 epa, still the second lowest of any subarea), and has generally older buildings, than Subarea 1. Daytime population density in this subarea would be somewhat higher than 210 epa because Subarea 5 has a number of older residential structures. Construction of an additional 1.8 million sq. ft. of new hotel space would result in more 24-hour residents. Because these buildings would be safer, per capita death rates in a major earthquake would be lower than for existing housing and hotels. The additional daytime and overnight users of the area brought in by increased retail, office and hotel development in this subarea would generally increase seismic hazards.

Subarea 6 would receive the second greatest amount of new development by 1990, with 5,900 new workers (14% of the C-3 District growth). Employee densities would be increased from about 475 epa to 550 epa. In addition, 300,000 sq. ft. of housing would be added to this area; and hotel space would increase by 33%. This area is currently zoned mostly for 240-400 ft. buildings. These tall buildings would add to the building surface mass available to fall to the street, and would bring more employees to this area. Subarea 6 would have generally less severe groundshaking (see Figure IV.K.1, p. IV.K.5) and population densities about 40% lower than Subareas 1 and 2. New buildings would be less likely to collapse or suffer major damage than existing structures, and a lower percentage (although probably higher numbers) of workers and residents would be injured.

Subarea 7 is projected to have relatively little increase in the number of employees between 1984 and 1990, and would show a slight increase in housing square footage. Little change in seismic safety would be expected from setting conditions in this subarea.

2000 Impacts

Implementation of the Downtown Plan would result in a projected employment growth of about 49,600 persons in the C-3 District study area between 1990 and 2000 (see section IV.C, Business and Employment). If a major earthquake occurred during working hours, these additional employees would likely have to be accommodated in San Francisco, regardless of their actual place of residence, for the three days in which the transportation systems may be unusable. Subarea 1 would receive approximately 22,750 new employees between 1990 and 2000 (46.6% of total C-3 District growth). This 10-year growth would be lower than the expected increase in the area in the six years from 1984 to 1990 (26,900). Employee density would rise about 12.5%, from about 895 epa to 1,010 epa. In addition, residential square footage would rise from 505,000 to 755,000 sq. ft. between 1990 and 2000, an increase of from 7.6% to 12.9% of all housing downtown. Hotel space would also increase by about 200,000 sq. ft. In addition, while building height limits in Subarea 1 generally would be lower than at present (maximum building heights would be reduced from 700 feet to 550 feet and some heights would be reduced from 500 to 250 feet), new buildings would generally replace even lower existing buildings. The addition of traffic generated by these workers, residents, and visitors, as well as fallen cladding and glass, would increase congestion, thereby reducing the ability of emergency vehicles to gain access to the area. The number of people on the sidewalks, and therefore vulnerable to falling glass and debris, also would be increased at all times of day. Although the rate of growth in Subarea 1 would decrease dramatically, the subarea is now, and would continue to be, so congested (with the equivalent density of over 573,000 persons per square mile in 1984), that any increased growth, including growth projected for the Plan, would add to an already dangerous situation in a major earthquake.

Development under the Plan would allow the conversion or demolition of pre-code buildings. Conversion of these buildings would result in their being brought up to Uniform Building Code (as amended) specifications; demolition would result in their replacement by more earthquake-resistant structures. The Plan would require retention of 271 buildings (Categories I and II) in downtown, the majority of which are in Subarea 1. These buildings may be brought up to code, however, this would not be required except for major rehabilitation. Buildings from which development rights were transferred would not necessarily be brought up to code. Reinforcement of these structures would be allowed but would not be required.

Approximately 20% (9,800 people) of the 1990-2000 growth projected under the Plan would be located in Subarea 2. This would be an increase of about 15% over the 1984-1990 percentage. This increase in growth of the daytime population in this area of high liquefaction/subsidence hazard would expose a larger number of people to seismic hazards than in 1990. Employee density in this subarea would be increased from about 315 epa in 1990 to about 450 epa in 2000, an increase of about 43%. Hotel space would increase by 225,000 sq. ft. where none currently exists. This increase in density would increase the probable number of injuries, and could hamper rescue efforts by adding to congestion on streets and sidewalks.

Subarea 2 also includes several surface parking lots. Development would both reduce the space available for emergency services staging areas and increase the number of people in this hazardous area. The allowable building heights (80-450 feet) would result in the potential for significant amounts of glass and debris to fall to the sidewalks and streets, which would also increase the number of injuries and deaths in this subarea.

Under the Plan, the employee population in Subarea 3 would increase from 3.7 percent of the total added to downtown between 1984-1990 to 6.2 percent of the change in employee population from 1990-2000. In all, about 4,500 new workers would be exposed to daytime seismic hazards. This subarea would have the lowest employee densities of any subarea in 1990 (125 epa) and 2000 (145 epa). Total employee densities would be under 15% of those projected for Subarea 1. The percentage of housing in the subarea would remain at about 15% of the total housing stock downtown, while transient hotel space would increase slightly. This area is geologically safer than Subarea 2 and fewer buildings would be vulnerable to collapse. Overall seismic hazards under the Plan would be slightly increased in Subarea 3, compared with 1990 conditions.

Subarea 4 would receive 5.2% (2,580 people) of employees that would be added to downtown with full development under the Downtown Plan (1990-2000). Employee density in this subarea would increase by about 15% (from 330 to about 385 epa) from 1990-2000. This is lower than the average density of about 530 epa for downtown. Development proposed for this subarea is not great and would not have a substantial impact on seismic safety to employees or residents.

Subarea 5 would contain about 10.8% of the employment to be generated under the Plan between 1990 and 2000. This compares with the 8.9% share of downtown growth projected for that area from 1984-1990. A total of about 8,990 new employees would be located in this subarea, increasing the employee density from 210 to about 250 epa, an 18% increase. This area contains over 75% of all residential hotel space and 40% of all housing in the downtown. The total residential hotel square footage is not projected to increase, and housing and transient hotel space are projected to show slight increases. Street and sidewalk congestion would be increased and emergency access would be reduced. Injuries would likely be increased from 1984 and 1990. This area contains a number of high-risk residential structures. If these structures were replaced by offices or by safer residential buildings, nighttime seismic hazards would be reduced.

Subarea 6 would have 14.4% of the 1984-1990 C-3 District employment growth (5,880 persons) and only 10.1% of the 1990-2000 C-3 District employment growth (4,940 persons) under the Downtown Plan. This subarea would have a relatively high 550 epa in 1990; which would increase to about 615 epa by 2000, still the second highest density in downtown. In addition, the 24-hour population would increase slightly with the addition of 300,000 sq. ft. of new transient hotel space. Residential hotel and housing would be the same as in 1990. Subarea 6 is the safest subarea in terms of ground stability. Collapse of either new or reinforced older buildings would be unlikely. Overall, daytime seismic hazards in this subarea would be increased by projected additional development.

Subareas 7 would receive 1,080 new employees, between 1984 and 2000 (one percent of new growth downtown). The replacement of some of the older buildings in Subarea 7 with modern buildings would improve seismic safety in that subarea slightly. Employee density in Subarea 7 would increase by about four percent and residential space would increase by about five percent. The development proposed for this subarea would not be great and would not have a substantial impact on overall seismic safety.

NOTES - Seismic Safety

/1/ Active faults are those which have a historic record of activity or show other geophysical evidence of movement within approximately the last 10,000 years.

/2/ The Richter Scale measures magnitudes of earthquakes based on the amount of energy released. It is a logarithmic scale, with each full point increase representing 30 times as much energy released as the previous point (i.e., a magnitude 5 earthquake releases 30 times as much energy as a magnitude 4 earthquake). The Federal Emergency Management Agency has estimated that the 8.3 Richter magnitude is the estimated largest magnitude earthquake that could be expected to strike the Bay Area at a reasonable level of probability, and that the main shock can be expected to be followed by large aftershocks over a period of weeks or longer. Each large aftershock would be capable of producing additional significant damage and hampering disaster assistance operations (p. 16).

/3/ James Dietrich, Director, Earthquake Prediction Program, U.S. Geological Survey, telephone communication, May 3, 1982.

/4/ According to An Assessment of the Consequences and Preparation for A Catastrophic California Earthquake: Findings of Actions Taken, Federal Emergency Management Agency, 1981, the current annual probability of occurence of a Richter Magnitude 8.3 earthquake is one percent if there is a moderate likelihood of its occurence in the next 20 - 30 years.

/5/ Roger D. Borcherdt, James F. Gibbs, and Kenneth Lajoi, Predictions of Maximum Earthquake Intensities in the San Francisco Bay Region, California, for Large Earthquakes on the San Andreas and Hayward Faults, U.S. Geological Survey, 1976.

/6/ Federal Emergency Management Agency, An Assessment of the Consequences and Preparation for A Catastrophic California Earthquake: Findings of Actions Taken, November 1980.

/7/ James F. Davis, John H. Bennett, Glenn A. Borchardt, et al., Earthquake Planning Scenario for a Magnitude 8.3 Earthquake on the San Andreas Fault in the San Francisco Bay Area, California Department of Conservation, Division of Mines and Geology, Special Publication 61, 1982.

/8/ John A. Blume, San Francisco Seismic Safety Investigation, Geologic Evaluation, 1974.

/9/ Liquefaction is the transformation of granular material, such as loose, wet sand, into a fluid-like state similar to quicksand. Subsidence is a lowering of the ground surface from settlement of fill or alluvium. This can occur from groundshaking, withdrawal of groundwater, or other causes.

/10/ S. T. Algermissen, W. A. Rinehart, James Dewey, et. al., A Study of Earthquake Losses in the San Francisco Bay Area: Data and Analyses, National Oceanic and Atmospheric Administration report prepared for the Office of Emergency Preparedness, 1972.

/11/ A. W. Garcia, and James R. Houston, Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, report prepared for the Federal Insurance Administration, Department of Housing and Urban Development.

/12/ This section is based on information gathered in a personal interview with Thomas Jenkins, Architect, Mayor's Office of Emergency Services, October 6, 1983.

/13/ These numbers were derived in 1972 on the basis of data from the 1964 earthquake in Anchorage, Alaska and 1971 earthquake in the San Fernando Valley. The data have not been updated on the basis of more recent earthquakes. According to Dr. Henry Lagorio, one of the authors of the 1972 NOAA Report cited above, these should be considered "first efforts" at estimating loss of life in a major earthquake.

/14/ Modern steel-framed high-rise structures are designed to be less susceptible to collapse than older masonry and concrete structures. However, according to Dr. Henry Lagorio of the Center for Environmental Design Research at U.C. Berkeley (personal conversation, November 9, 1983), well-constructed older, reinforced masonry buildings may be as resistant or more resistant to collapse in a major earthquake than modern steel-frame highrises. This is because the older structures may have greater duplication of load-bearing walls than the new structures and, therefore, a second 'line of defense', should the primary support structures fail. In addition, death or injuries in an earthquake-resistant structure could still result from collapse or fall of interior fixtures, furniture, and ceilings. The placement or attachment of such fixtures often is not a function of building design, and cannot necessarily be expected to correspond with the structural safety of the building. Although control over placement of these objects is not contained in the Uniform Building Code, the representatives of the Mayor's Office of Emergency Services will inspect structures and make recommendations on all of these matters, if requested.

Old, unreinforced structures or old concrete-block structures generally have poor resistance to earthquakes, and are much more likely to fail than either new structures or reinforced masonry buildings.

/15/ Preservation of older structures, some of which are not in conformance with the current seismic safety requirements of the San Francisco or Uniform Building Code, could increase the likelihood of death or injury to occupants, but could result in fewer people downtown and, therefore, fewer people being vulnerable to hazards than would modern high-rises at those sites. If development rights are transferred from these sites, as permitted in the Plan, the net result could be a relocation of potential development and accompanying workers to other downtown sites. This would then not reduce the number of people downtown, but would simply redistribute them.

/16/ The time of day that an earthquake occurs is an extremely important factor in determining the numbers of deaths and injuries that would result from a major earthquake. Earthquakes occurring between 7:00 a.m. and 7:00 p.m. during a weekday would pose the greatest hazards to the C-3 District; earthquakes at the noon-hour, or during rush hours would be the most severe within this period. An earthquake during the pre-dawn hours would pose the least hazard in the C-3 District, as most of the daytime population would be elsewhere. Residents of older residential buildings in Chinatown, the Tenderloin and the South of Market areas would still be subject to considerable hazards.

/17/ Jeffery Ma, Parapet Inspector, Bureau of Building Inspection, City of San Francisco, personal conversation, November 7, 1983.

/18/ Franklin Lew, Deputy Superintendent, City of San Francisco, Bureau of Building Inspection, telephone conversation, December 22, 1983.

/19/ Dr. Joseph Penzien, University of California, Department of Engineering, telephone conversation, November 11, 1983.

/20/ According to Dr. Henry Logario, Center of Environmental Design Research, U.C. Berkeley, (personal conversation November 9, 1983), a high-rise building supported on a floating mat foundation was observed to have tilted during a recent earthquake in Japan.

V. MITIGATION OF ENVIRONMENTAL IMPACTS

INTRODUCTION

This section presents a number of measures that would reduce or otherwise alleviate the adverse environmental effects identified in Section IV. Some of the measures described are proposed in the Downtown Plan, some are proposed in the Alternatives presented in Section VII., and some have been identified for other sources. Not all of the measures included in this chapter are mitigation measures for significant physical environmental effects that may result from implementing the Downtown Plan or any of the other alternatives.

In general, the emphasis in presenting these measures is upon those measures that could be implemented by the City, particularly through adoption of amendments to the Comprehensive Plan and Planning Code. However, a number of other measures, requiring cooperative actions by other authorities, or amendments to other local policies or laws, are also presented if they are critical to the alleviation of significant adverse effects of downtown growth.

In the discussion of mitigation measures, emphasis is also placed on identifying measures that would not themselves have significant environmental effects in addition to those identified in Section IV. Where measures are identified that would have additional significant effects, those effects are discussed.

MITIGATION MEASURES

A. ANNUAL GROWTH RATE LIMITS

In this EIR the Downtown Plan has been analyzed independently of any additional regulatory ceilings on the rate of new development. In 1980, San Franciscans for Reasonable Growth (SFRG) proposed initiatives for regulating downtown highrise development. One of these initiatives proposed limiting new commercial office development in the City to 1.0 million sq. ft. per year. As in the Downtown EIR Consultant's Report, a range of annual citywide growth limits is applied to the Downtown Plan in this mitigation section. Thus, these limits have been considered with respect to the Plan and all five Alternatives.

The three regulatory limits discussed in this section are:

- 0.5 million sq. ft. per year (msf/yr.)
- 1.0 msf/yr.
- 1.5 msf/yr.

These annual limits are assumed to apply to citywide office development not solely to the C-3 District. The following discussion describes the general effects of these limits and how they might be implemented. Conclusions regarding more specific effects on employment, housing, transportation, urban design and architectural resources, etc. are discussed in subsequent sections from the perspective of whether the limits would mitigate specific impacts. Each of these following sections also considers other mitigation measures besides growth rate limits.

Potential Effects On New Development

Office Development

There are two issues involved in considering the effects of annual limits on office development. One is the amount of development that would be allowed and the difference between the limit and the amount of construction that would have occurred in the absence of a growth limit. The second issue concerns the criteria to be used to allocate the permits and whether these criteria would affect the type or location of new development (in addition to the effect on the amount of construction).

Table V.A.1 illustrates the likely effects of the three annual limits on the amount of new office construction throughout San Francisco. While other scenarios are possible (depending primarily on selection criteria), this example illustrates the potential impacts of the different limits and highlights the differences between them and over time. The effect of the annual limits is expressed as the percentage of new office development forecast to occur under the Plan, that would not occur due to these additional regulations.

TABLE V.A.1: EFFECT OF ANNUAL LIMITS ON CITYWIDE OFFICE CONSTRUCTION FOR THE DOWNTOWN PLAN, 1984-1990 and 1990-2000

	Percent That Would Not Be Built	
Annual Limit	1984-1990 %	1990-2000 %
1.5 million sq. ft.	20-30	0-5
1.0 million sq. ft.	45-55	30-40
0.5 million sq. ft.	70-80	65-75

NOTE: The citywide estimates in this table are based on assumptions about the percent of total citywide office development represented by forecast C-3 District office development under the Downtown Plan. The assumptions varied by time period: between 1984 and 1990 about 80 percent of new citywide office development would occur in the C-3 District; between 1990 and 2000 the percentage would decline, under the Downtown Plan, to about 55 percent.

SOURCE: Recht Hausrath & Associates

Since the annual limits on office development would apply citywide, the percentages in the table refer to total office development throughout the City. The later discussion of criteria for allocating permits considers whether the C-3 District would be affected similarly to other areas of the City, in which case the citywide percentages would also apply to the C-3 District.

For the 1990 to 2000 period, the table shows the following:

- An annual limit of 1.5 million sq. ft. of office development per year is unlikely to have much effect under the Downtown Plan.
- A limit of 1.0 million sq. ft. per year could limit office development in the City by 30-40 percent.
- A limit of 0.5 million sq. ft. per year could have a more dramatic effect on City office development otherwise expected under the Plan. The majority of new development (65-75 percent) would not be allowed.

If the limits were enacted in the near future and were applied to projects projected to be developed during the 1984 to 1990 period, fewer projects would be built. The effect could range from 25 to 75 percent less development depending on the annual limit adopted (see the estimates in the table). The effect would be less if the limits were enacted sometime after 1984.

The criteria for allocating permits under a system of annual limits would determine how office development in the C-3 District would be affected relative to development elsewhere in the City. Generally, the citywide percentages in the table could apply directly to the amount of C-3 District office development or the C-3 District could be more or less affected depending on the type of criteria used. Three types of criteria are discussed below.

- Random Selection: If permits were allocated through a lottery, first-come-first-served, or other random system, the magnitude of the difference between the annual limit and the amount of development which would otherwise occur becomes an important consideration.
    - In situations where the limits are most constraining (0.5 million sq. ft. for example), a reduced supply of development would result in higher rents for space. Higher rents (induced by a shortage of supply relative to demand) would increase the feasibility of new construction. The enhanced feasibility would have more effect on the periphery (in terms of making projects feasible which would not otherwise be feasible). As this occurs, there is likely to be a more sprawled development pattern. The C-3 District would likely end up with a lower share of the new development built in the City. Thus, there would

be more effect on development in the C-3 District than elsewhere in the City. The high-end percentages in the table above would probably apply for the C-3 District.

  - In situations where the limits are relatively less constraining, there would be less pressure for sprawl. Development in the C-3 District and elsewhere in the City would be affected more similarly. Thus, the percentages in the table would apply throughout the City including the C-3 District.

- Criteria Which Cost Money: Permits could be allocated based on criteria which cost money to implement, such as the provision of housing, or transportation improvements. With these types of criteria, locations in the more desirable office areas would be likely to represent a larger share of future development because these developers would be more able to pass on the higher costs through higher rents. A system using these types of criteria is likely to result in a greater share of new development in the C-3 District and a lower share elsewhere in the City. Thus, there would be less effect on C-3 District development than on development in other locations. The low-end percentages in the table would apply to the C-3 District in this case.

- Criteria To Direct Development: Permits could be allocated based on criteria which relate to the location of development, such as encouraging development near transit corridors and stations. Some of the key elements of the Downtown Plan (required retention of category I and II buildings, low height limits, conservation districts) are designed to redirect new development in the C-3 District. Therefore, annual limits based on similar criteria would be redundant under the Plan, and could interfere with the effectiveness of these other Plan policies.

The comments above would be more applicable to the 1990-2000 period, because most of the development expected in the 1984 to 1990 period has already been approved. It would not be possible to require redesigning approved projects to satisfy the physical and/or financial criteria of a permit system.

Other Uses

The effect of annual limits on office development raises the question of how the development of other uses might be affected. The following comments can be made:

- The amount of office development (and the associated employment in office space) affects the demand for retail and hotel uses. Generally, less office growth would mean less growth of retail and hotel uses. However, since these latter uses satisfy demand besides that from office activity, they would be affected less than office development. For example, in the C-3 District, about one-third of retail demand is from office activity. If office growth were 40 percent less, retail growth would be about 13 percent less. Reduced office growth would have even less effect on hotel activity (only to the extent that less office activity would mean less business travel).
- The amount of office development could affect the ability of other uses to compete for certain locations. Less new construction could mean more rehabilitation, conversions, and upgrading of existing space for office uses. Therefore, rents would increase and lower-rent-payers would have trouble finding space.

In general, other uses would be affected much less by the annual limits than would office uses. The exception, of course, would be situations where the criteria for allocating permits favored a particular use (such as retail or housing).

B. LAND USE AND REAL ESTATE DEVELOPMENT

Introduction

This section presents four general categories of actions which are related to achieving the goals and objectives of the Downtown Plan. These actions are discussed as means by which the City could further influence the real estate market conditions resulting from implementation of the Plan. The four major action categories are:

- maintaining a supply of lower rent office space
- preserving a supply of industrial and support commercial space
- maintaining sufficient demand for TDRs
- producing housing

The Downtown Plan could be modified, or other City policies could be implemented in conjunction with the Plan, to aid in accomplishing these goals. Important economic considerations for making these policy adjustments are discussed below along with suggestions regarding possible adjustments.

Controlling downtown office growth through annual limits on new office development is considered in the previous section (V.A). The real estate market effects of a range of annual limits are described and potential differences in effects, depending on the criteria selected for allocating permits, are also described. All of the subsequent mitigation sections (V.C through V.K) begin with a discussion of the degree to which the reduced amount of development under an annual limit system would change conclusions regarding the effects of the Downtown Plan.

Maintaining A Supply Of Lower Rent Office Space

The Downtown Plan would result in a real increase in C-3 District office space rents over time. Moreover, locations that might otherwise have been considered suitable for lower-rise, lower-cost space would be limited under the Plan. Generally higher-rise office buildings are expected to be constructed in Subarea 2 (the Special Development District). Rezoning in Subareas 3, 5 and 7 to protect existing uses, particularly housing, would reduce the availability of sites for large-scale office development and would limit the ability to supply more moderate cost space for smaller office firms that do not require a location in the core office area.

It should be noted, however, that the size and scale of existing C-3 District development is already to a level where lower-cost options for large-space-users can best be provided in locations outside the C-3 District. This is evident in recent decisions by major San Francisco firms to relocate their data-processing and other large-space-using functions to business parks on the periphery of the Bay Area, as well as in the number of proposals for new office construction and major conversions of industrial/warehouse space to office use south of Folsom Street. Recent decisions to evaluate the locations or data-processing functions have been necessitated by the large and rapid growth of these activities over the last decade. These shifts are partially acilitated by technological changes making de-centralized office operation more feasible. They are also attributable to the ability of the new business arks to satisfy the space requirements (in terms of design and expansion apability) brought about by technological changes in office operations.

pace costs in the C-3 District are also a contributing factor. Actions to acilitate the development of lower rent office space in locations outside the -3 District could mitigate some of the Plan's impact on the more cost-sensi-ve office activities. Areas outside the C-3 District, particularly those to he south of Folsom Street, offer the most potential for developing more oderate cost office space in San Francisco. Existing development is of low intensity, and there is the potential for a large amount of newly built space.

and use policies for office development in these more peripheral areas will influence the amount and type of development which occurs there. From the erspective of maintaining the supply of more moderate rent space, the fol-lowing factors are important. Policies affecting the size of future development should allow floors with large amounts of space. The role of rehabilitated older space in providing lower rent options for smaller firms should also be considered. Requirements for design, other amenities, and mitigating the impacts of development should be sensitive to the additional development costs that they might impose. These types of requirements could increase the costs of development to the point where the advantages of the location are overcome by the higher costs. Steps to resolve potential conflicts between existing and future uses should be taken in setting policies for the area, rather than leaving the conflicts to be resolved through case-by-case reviews. The potential areas available for these types of office development should be large relative to demand, to limit competition for sites.

Preserving a Supply of Industrial and Support Commercial Space

The City has recently enacted South of Market Industrial Conservation Special Use District (SUD) Interim Controls (Ordinance 574-83, adopted November 28, 1983). The boundaries of the SUD extend from the Central Freeway east to Third Street, and from just south of Mission Street to Brannan and Townsend Streets, excluding the YBC Redevelopment Area. The SUD includes about one-half of the land area in Subarea 3. The enactment of the interim controls reflects the City's concern that it continue to provide space on affordable terms for most support commercial activities. These are activities that could potentially be displaced either by demolition of the space they occupy to allow new office construction or by rehabilitation and conversion of their space to office use.

The interim controls limit the basic floor area ratio for new office development to 2:1 and impose an off-street parking requirement for offices that is intended to make infeasible most new development as well as most conversion of industrial and residential space for office uses.

The Planning Department is now undertaking more extensive studies of the South of Market area. It intends to prepare permanent districts and standards for this area of the City. This subsection considers the longer-term implications of zoning and land use controls similar to those incorporated in the South of Market SUD.

Policies of this type could reduce the pressure to redevelop or convert industrial and warehouse sites for office use. They could also keep rents at lower levels. This would result in retaining some types of uses in this area that might otherwise have had to move out of the area. The uses that would benefit most would be small business services and distribution activities, particularly those that serve other C-3 District businesses.

While these policies would retain a supply of industrial and other lower-rent space, they would not necessarily retain existing uses in this space. Changing production techniques, declining demand for some products, and older, out-moded facilities will result in the decline of some of these activities, regardless of pressures on rents from downtown office activities. Some other businesses will move to improve access or to attract a certain labor pool. This could result in a supply of vacant space, particularly in large, older buildings.

Several factors need to be considered in planning to maintain industrial and support commercial activity over the long term. First, it is important to identify the types of industrial and support commercial businesses that would demand space in the area, to consider future trends for these types of operations, and to evaluate their location preferences, space needs, and rent-paying abilities. Second, another factor to be considered is how the supply of space (amount and type) in this area matches these space needs and preferences. Third, to minimize economic and political pressures for change in spite of the protective controls for this area, it is important to provide adequate space in other areas to accommodate new development and conversions. Because the Downtown Plan, in combination with protective controls of the type incorporated in the South of Market SUD, would result in limited locations for lower-rent-paying office uses, it would be particularly important to identify a desirable area large enough to satisfy the future space needs of these expanding activities. Finally, there is a potential conflict between the goal of preserving a supply of industrial and support commercial space and the goal of maintaining a supply of lower-rent office space. Each goal is likely to be best achieved by facilitating the other; the planning efforts to meet each of these goals should be pursued in tandem.

Specifically regarding the C-3 District forecasts under the Downtown Plan, if controls such as those incorporated in the South of Market SUD were to remain in effect during the period of implementation of the Plan, then conversions in Subarea 3 (about one-half of which is included in the SUD) would occur to a lesser extent than forecast and described in the text (Section IV.B). This would mean that there would be less growth of office space in the C-3 District, reducing the supply of lower-rent office space from what it otherwise would be under the Plan. There would also be less decline in industrial/warehouse and automotive space than is forecast to occur by 2000 in this subarea.

Maintaining Sufficient Demand For TDRs

The program of transferable development rights (TDRs) is a key element of the Downtown Plan, both for the preservation of architecturally significant buildings and for the redirection of growth from the north of Market portion of the C-3 District to locations south of Market Street within the District. As described in Section IV.B, Land Use and Real Estate Development Impact, many of the policies of the Plan would combine with real estate market forces to provide incentives for the use of TDRs. It is possible that the demand for TDRs in the C-3 District could absorb the supply created in the Plan over a period of 25 to 35 years (after 1984). During this time period, it is likely that some contributory buildings would be demolished because TDR demand would not be sufficient to create strong incentives for a property owner to sell development rights rather than demolish the building and build new. Furthermore, the potential supply of TDRs in Subarea 1 could be large relative to potential demand from new development in Subarea 1, at least for some time into the future. This subsection considers the types of adjustments that could be useful in fine-tuning the operation of the proposed TDR system. Monitoring the actual operation of the system would identify the need for adjustments.

There are a number of options by which the City could directly increase the demand for TDRs. The effectiveness of these measures would depend on the demand for additional space in the selected areas. The City could increase the demand for TDRs by increasing the height limits in selected areas. The increased building space could only be allowed if the development absorbed additional TDRs. The City could also increase the demand for TDRs by allowing transfer to development sites outside of the C-3 District, perhaps in an area south of Folsom Street that might be planned for expansion of the office district. The policy would provide for additional allowable space above the standard which would otherwise apply in the area. The policy would have the same basis as the Downtown Plan strategy for the C-3 District: that an individual site could accommodate more development than the base FAR allows, if that development is shifted from another site, i.e. if it does not add to the total development potential of the area.

The definitions used in Subareas 1 and 2 to determine the amount of TDRs available from a preservation site or that could be used on a development site could help to balance TDR supply and demand in Subarea 1. In particular, the demand for TDRs is affected by whether or not ground floor retail space in new buildings is included in the space counted against the base FAR allowed. The demand for TDRs could be increased by counting all occupied building space (whether required to be retail or not). For example, to the extent that height limits and other policies allowed, a Subarea 1 developer would have to use more TDRs to exceed the base FAR of 10:1, rather than achieving a portion of that excess with ground floor retail space. Similarly, counting ground floor retail space against the existing building space to calculate the supply of TDRs available from a designated building site would have the effect of reducing the overall supply of TDRs. The result of either one or both of these measures would be a more advantageous balance between TDR demand and supply in Subarea 1.

Further adjustments to the proposed TDR system could include modifying the policies allowing transfer of TDRs to the Special Development District (Subarea 2) from all other use districts. Depending on how the TDR system works and how fast development occurs in the Special Development District, it may be desirable to limit the ability to transfer from the outlying use districts n order to preserve the opportunity for selling Subarea 1 TDRs in the Special Development District. This might be accomplished by regulating the amount and/or type (Category I, II, III or IV) of TDRs allowed to be transferred to Subarea 2 in any particular time period. (It should be recognized, however, that this change could slow the rate of development in Subarea 2.) Such complexities could hinder the operation of the TDR system; it is possible that this regulation of the TDR market could be facilitated by an intermediary that brokers or banks TDRs.

Producing Housing

Housing production mitigation measures are considered here in terms of their relationship to new C-3 District development. Housing production policies are considered in more detail in Section V.D, Residence Patterns and Housing Mitigation, from the perspective of effects on the supply of housing in the City.

From a real estate market perspective, there are three primary public policy approaches to achieving additional housing development in the City. Such measures could be adopted to alleviate pressures on the City's housing market that could be attributable to new office development and the associated employment growth in the C-3 District. These measures could be adopted individually or in combination.

The first approach is to allow additional space in office buildings if that space is devoted to housing. Another approach is to provide an FAR bonus of office space as an incentive for the production of housing, that is, more office space would be permitted if housing were also provided. The third method to induce housing production is to require it as a condition of commercial development; the privilege of commercial development becomes the incentive, in this case.

To encourage C-3 District housing production, the Downtown Plan allows development to exceed the base FAR in the C-3-G and C-3-S use districts if that additional space is devoted to housing. As described in the impact sections (IV.B and IV.D) this would result in some additional housing supplied in the downtown area and would result in somewhat larger buildings in the designated districts, within height, bulk and other building form limitations.

A similar policy could be considered in other commercial areas outside the C-3 District. This policy could not be so easily applied in other parts of the C-3 District (C-3-0, C-3-0(SD), and C-3-R use districts). First, in the C-3-R and parts of the C-3-0, the base FAR is close to the limits of height, bulk and other building form policies proposed in the Downtown Plan. Second, in all three use districts, it is likely that new office buildings would be constructed at, or close to, height, bulk and other limits using TDRs. Substituting housing for office space would reduce the demand for TDRs, which could affect the historic preservation program proposed in the Plan (see previous discussion about maintaining sufficient demand for TDRs). Furthermore, the economic incentives for commercial development in these areas would be stronger than those for new housing development.

Providing office space bonuses as incentives to produce housing would result in more housing production than would the first method. This method is also more likely to provide units at lower prices and rents than would otherwise be provided, to the extent that the developer's return from the additional office space is used to subsidize the housing. The amount of the subsidy would depend on the size of the bonus and any conditions, such as providing low and moderate income housing. Office space bonuses as incentives to produce housing would compete with other incentives. For the Downtown Plan, such a bonus would compete with and reduce the effectiveness of the TDR program for the preservation of architecturally significant buildings and thus would not be supported by the Department of City Planning.

The third approach is embodied in the City's Office-Housing Production Program (OHPP) which is currently in effect in the C-3 District and hroughout the City. A requirement to produce housing or contribute to a ousing production fund in proportion to new office development would result n more housing produced in the City. The amount of housing produced ould probably be less than the requirement, to the extent that developers ontributed to a fund for the production of low and moderate income units. t should also be recognized that not all of the housing produced would be a et addition to the citywide housing stock. More of the units produced hrough the fund would represent net additions, however.

The housing requirement would increase the costs of developing office buildings. Because of generally high demand for office space in the City, new development would continue to occur and additional housing would be produced in San Francisco as a result. The additional development costs would result in somewhat less C-3 District office growth because, as developers attempted to recover the costs in higher rents, cost-sensitive office activities would look elsewhere for space. Citywide application of OHPP would to some extent counteract the ability of the areas south of the C-3 District to absorb the demand for lower-cost office space. Development in these areas, directed towards this demand group, would be more vulnerable to the higher development costs than would new development in the core office area.

C. BUSINESS AND EMPLOYMENT

Annual Limits On New Commercial Office Development In San Francisco

To the extent that annual limits on new office development resulted in less office space growth each year, there would also be less office employment growth. Employment growth might not be affected as much as space growth, however, since businesses would attempt to use space more efficiently (higher employment densities) and there would be more pressure to upgrade, expand, and intensify the use of existing space as well as to convert space to office uses.

Annual office development limits would lead to higher rents and higher costs of doing business in San Francisco as less space is rationed among competing uses. Office rents would be highest under the most restrictive annual limits. There would be differential effects among office business activities and types of firms largely depending on their preferences for a San Francisco location and their rent-paying abilities. The office activities most affected would be those firms most sensitive to the costs of space. These tend to include the smaller office businesses and the back office functions of larger firms that would generally be most affected by Downtown Plan policies, as described in the employment impact section. Since the growth limits would apply citywide, the effect of fewer office businesses and less employment growth in San Francisco would be more economic activity in other Bay Area counties and outside the region.

The criteria for allocating building permits could influence the types of office businesses and functions which are affected. A merit system could be used to encourage certain activities over others. Yet it would be difficult to implement such a system for purposes of business and employment goals, since the policies apply to the construction of space and not directly to those who would occupy the space.

The lower growth of office activities and employment resulting from development limits could mean less support for other businesses and jobs. These would include retail stores, restaurants, construction activity, and a large range of services such as banking, building maintenance and security, messengers, copying and printing, etc.

Although the amount of office development (and the associated employment in office space) affects the demand for retail space, other factors besides office activity support retail activity. Thus, reduced office growth would have proportionally less effect on retail activity and development. Similarly, office activity could affect business travel and hotel usage, but such effects would make relatively little difference in overall hotel activity and tourism. Because these non-office uses would be affected less than office uses, retail and hotel activities would represent a proportionally larger share of total economic activity if office development was restricted according to annual limits. Similarly employment opportunities for retail and hotel workers would be affected much less than would job opportunities for office workers.

Providing Opportunities For Office Activities Sensitive To Space Costs

Because there are businesses and job opportunities in the C-3 District that are affected by the availability and price of space, actions to encourage the construction of lower rent office space or conversions of underutilized older space could directly mitigate some of the impacts of less space and more costly space on businesses that are unable to compete under the C-3 District real estate market conditions of the Plan. Areas outside the C-3 District, especially to the south, are the most likely candidates for future development of lower rent space. The preceding mitigation section (Land Use and Real Estate Development) describes how this could be accomplished.

Policies that provided for the expansion of downtown activities south of the C-3 District would have an impact on existing businesses in those areas, however. While some of these businesses may be operations that would eventually go out of business or move to a more suitable location in any case, there is the potential for conflict between the expanding downtown activities and other businesses that have traditionally served the C-3 District from outside the downtown area or that enjoy this location for other reasons, e.g. highway access.

Unless regulated by a development moratorium or selective rezoning, businesses willing to pay the highest price for the space will prevail. Therefore, some existing businesses are likely to be displaced. Most could find suitable locations elsewhere in the City. This could be facilitated by City policies and/or actions designed to maintain a diversity of economic activity and job opportunities in San Francisco. The City could assist in relocating displaced businesses by providing sites or space in other locations (either directly or through rezoning). Transportation and other infrastructure plans and programs could be designed to accommodate these shifts of activity. The success of this strategy depends on whether or not other economic factors would support the businesses at the new location.

Preserving Existing Industrial and Downtown Support Activities

The City has recently enacted South of Market Industrial Conservation Special Use District (SUD) Interim Controls (Ordinance 574-83, adopted November 28, 1983). The boundaries of the SUD extend from the Central Freeway east to Third Street and from just south of Mission Street to Brannan and Townsend Streets, excluding the YBC Redevelopment Area. The SUD includes about one-half of the land area in Subarea 3. This subsection considers the implications of permanent application of controls similar to those embodied in the SUD in this South of Market area.

The intent of the SUD controls is to limit the scale and amount of new office development south of Market Street and to limit the displacement of existing activities by office uses. Limiting the scale and amount of new office development would remove this part of the City from consideration as a potential area in which to accommodate much of the back-office functions that would be looking for space in San Francisco. To the extent that the controls would limit conversions to office use, they would reduce the options for smaller businesses seeking lower-rent space in existing buildings in this area.

The controls would be effective in reducing the pressure on the smaller business services and distribution activities in this area. In particular, those that provide direct support to C-3 District businesses would benefit from the protective rezoning. Regardless of new development controls in the South of Market area, however, some remaining industrial activities would go out of business or leave the C-3 District for other reasons besides increasing rents. These could include changing production techniques, declining demand for some products, out-moded facilities, and the need to improve access.

More restrictive zoning in a large portion of the South of Market area would increase pressures on existing businesses in other areas that would not be similarly protected. Some of the displacement that would otherwise occur in this part of the South of Market would instead occur in less intensively developed portions of the C-3 District (parts of Subareas 3, 4 and 5) and in other areas north and south of the C-3 District. Similar types of businesses would be affected.

As noted in the land use and real estate development mitigation section, there is a potential conflict between the goal of preserving existing industrial and downtown support activities and the goal of providing opportunities for lower-rent-paying office activities. Planning efforts to achieve these goals should be coordinated to be effective. This coordination is important because the types of jobs affected (lower-level office jobs and industrial and crafts jobs) each provide opportunities for different segments of the City's labor pool.

With regard to the C-3 District employment forecasts to the year 2000, if controls such as those incorporated in the South of Market SUD were to be applied in conjunction with the Downtown Plan, then there would be some difference in the employment forecasts for Subarea 3. Specifically, there would be somewhat less growth of office employment in this area, due to the reduced supply of lower-rent space (primarily in space converted from other uses). On the other hand, there would also be somewhat less decline in industrial/warehouse/automotive employment. Employment in these activities would not increase in the C-3 District in any case but would continue to decline, though at a slower pace than forecast in the text (see Section IV.C).

Job Training

Technological changes in business operations, a changing mix of businesses with different labor needs, and a growing segment of the City's labor force dependent on entry-level positions combine to suggest that job training programs could assist in improving the match between job opportunities and the supply of available labor in the City.

Programs could include training in basic language and work skills, training for specific job functions and categories, and apprenticeship programs. Generally, employers with large numbers of entry level jobs are more likely to be interested in participating in these programs. The sponsors for such programs could be employers, groups of employers, industry associations, or educational institutions. The City's Community College system offers courses that would serve many of these functions; sponsors could work directly with the Community College to develop courses and could recruit from the trained students. This would also help encourage employment of San Francisco residents.

D. RESIDENCE PATTERNS AND HOUSING

Basic Approaches

There are two basic strategies for the mitigation of housing market impacts of C-3 District development. One is to take steps to reduce the amount of employment growth. The other is to produce more housing, thereby relieving the increased pressure on the housing market from increased employment. Measures that reflect both approaches are described in this section.

If restrictions on new development were imposed for purposes of limiting employment growth, employment opportunities for both San Francisco residents and non-residents would be fewer than otherwise. The advantage would be that housing price increases in the City would probably be less than otherwise (assuming a similar housing stock in both cases).

The other types of mitigation would encourage the development of new housing in San Francisco. Additional housing would mean that housing price increases would be less than otherwise (assuming similar employment). An additional benefit of this approach is that it would not directly limit employment opportunities. To the extent that housing is built in San Francisco, the number of San Franciscans employed in the C-3 District would be greater than otherwise.

Annual Limits On New Commercial Office Development in San Francisco

If annual limits on new office development resulted in less office space growth and less growth of employment, there would be implications for residence patterns and for the housing market. In conjunction with the Downtown Plan, annual limits of 1.0 million sq. ft. per year or 0.5 million sq. ft. per year would result in substantially less employment growth in San Francisco than is otherwise forecast for the Plan. The following discussion follows from the fact that the annual limits would apply to citywide office development. If development in the C-3 District were favored under the criteria for allocating permits, then the conclusions would apply to a lesser degree for C-3 District workers.

Effects On Residence Patterns

From the perspective of the residence patterns of those employed in the City, fewer persons employed in San Francisco would result in fewer San Francisco workers residing in each of the counties of the region. The number of these workers living in San Francisco would be affected less than the number in other counties. This is because of the high relative propensity for individuals to live and work in San Francisco. It is also because relatively more growth of non-office employment compared to office employment would mean proportionally more San Francisco residents since the non-office business activities have larger percentages of workers who reside in San Francisco (hotel and retail particularly).

Thus, the percentage distribution of workers according to county of residence would include a larger percentage living in San Francisco and smaller percentages for the other parts of the region. The extent of effect on residence patterns depends on the effect on employment. The greater the limits on office employment growth (annual limits of 0.5 million sq. ft. per year compared to 1.0 million sq. ft. per year), the larger would be the percentage of workers who live in San Francisco relative to those living in the other counties. Although the percentage would be larger, the number of individuals living and working in San Francisco and in other counties would be smaller.

From the perspective of residents of the City, fewer would work in San Francisco if employment growth were limited by office development. Both the number of existing residents who become employed in San Francisco and the number of workers who move into the City would be smaller.

Effects On The City's Housing Market

From the perspective of the City's housing market, less employment growth would mean less increase in the competition for San Francisco housing. Limits on office development would have less effect on the competition for City housing than on employment growth, however. The demand for housing is influenced by other factors besides place of work and not all of those newly employed because of job growth would choose housing in San Francisco. Furthe less increase in competition for City housing as a result of fewer persons newly employed (due to limits on office development) might result in more interest in San Francisco housing from existing employees and from those newly employed because of turnover in existing jobs.

The amount of housing growth also affects the competition for San Francisco housing. Under the Downtown Plan, annual limits on office development would have little or no effect on the amount of housing produced in San Francisco. In only a few cases would new housing be developed as a part of office building projects./1/ The Office-Housing Production Program is considered separately as a mitigation measure because it is not on the same legislative track as the Downtown Plan.

In summary, annual limits on new office development would affect the housing market to the extent that there is less employment growth relative to forecast increases in housing supply. Less employment growth would mean somewhat less increase in the competition for San Francisco housing. Less increase in the competition for housing would result in somewhat less upward pressure on housing prices and rents.

As described in detail in Section IV.D. Residence Patterns and Housing Impact, there are numerous factors besides employment growth and housing production that affect housing prices and rents. Therefore, it is unlikely that changes in these factors alone would result in large changes in housing prices and rents.

Housing Production Strategies

Two conditions are necessary for housing production policies to result in reduced pressure on housing prices/rents and an increase in the number of C-3 District workers living in the City. One is that the housing which is built must represent a net addition to the stock. The other is that the cost of providing housing must not substantially reduce the amount of employment growth. There can be feedback between housing programs and employmen growth. The Office-Housing Production Program which is discussed in most detail below is an example of a program which increases the housing supply and has a small effect on employment growth.

While increasing the housing stock could keep housing prices somewhat lower than they otherwise would be, housing development could be controversial in some instances. The Residence Element of the Comprehensive Plan includes six policies under Objective 1, "To provide new housing for all income groups in appropriate locations," which establish general principles for determining appropriate locations, such as use of surplus or vacant public land, underused industrial and commercial land, and infill sites./2/ Actions proposed to carry out these policies are described in the "Implementation Programs" section of the Element and include discussion of specific sites proposed for rezoning to residential use. Examples are surplus school sites, City-owned land on Wisconsin Street and Muni-owned land. Planning Department studies for Rincon Hill, Van Ness Avenue, and North of Market areas are also described. Studies and rezoning proposals for many of these areas have not yet been completed.

Number Of Additional Housing Units

Although increasing the housing stock yields benefits in terms of the City's housing market, it is difficult to quantify how much additional housing should be built. The question is often asked as to how many units would be needed to "balance" housing demand and supply so as not to increase the competition for existing housing because of employment growth. However, this seemingly simple question cannot be answered directly in the way that many would like. It is not simply a matter of building housing for the forecast growth of City residents working in the C-3 District. Within the range of housing production that might be possible and given the large number of households with preferences for San Francisco housing, adding more housing would result in a larger number of C-3 District workers who are City residents. It would also result in more non-C-3 District workers moving into San Francisco. Thus, the question can only be answered in relative rather than absolute terms. Basically, the more housing which is produced relative to the amount of employment and employment growth, the less would be the effects on the City's housing market.

The net addition of about 1,000 units per year (assumed in the Plan forecasts without OHPP) would result in more housing added per additional C-3 District job than occurred in the 1970 to 1980 period. Thus, the jobs-housing "balance" is likely to improve over time. A larger amount of housing would further reduce the increased pressure on the City's housing market. If more units were built each year, then the increase in C-3 District workers residing in San Francisco would also be higher than forecast in this EIR. It is not necessarily the case that more units would result in no effects on the City's housing market. There would be less effect than if fewer units were built, however. As a goal for housing mitigation purposes, housing production averaging more than 1,000 units per year, perhaps within the range of 1,000 to 1,500 units per year, would improve the housing market situation that exists in the City in the early 1980s. Production at the higher end of this range could further reduce overall market pressures below current and recent past levels.

Office-Housing Production Program

The EIR forecasts of citywide housing development in San Francisco do not assume that housing assistance would be required as a condition of new office development. If such a requirement were implemented, there could be implications for housing production, employment growth, residence patterns, and housing market impacts. The City's Office-Housing Production Program (OHPP) was evaluated as a mitigation measure for housing impacts under the Downtown Plan.

Effects On Housing Production And Employment Growth. The OHPP policies would increase the amount of housing built in San Francisco. Between 1990 and 2000, it is estimated that citywide housing production would be increased by about 1,800 units because of the housing provided to meet the OHPP requirements of C-3 District office developers. Additional housing (another 1,000 to 1,500 units) would be produced because of requirements for office developers outside the C-3 District. Thus, the total production of about 10,200 units would be increased to about 13,000 to 13,500 units./3/ The average production per year would be in the order of 1,300 units.

The total additional 1,800 units supplied between 1990 and 2000 would represent the net addition of units produced in San Francisco because of the OHPP policies applied in the C-3 District. The total number of units built to satisfy the requirements would be a larger number. The existing OHPP requirements can be met by the construction of market-rate housing. Assuming this type of policy is implemented in the future, much of this housing would be located outside the C-3 District. Not all of these units would represent a net addition of housing for the City, either they would have been built anyway, or they provide units which satisfy demand that would have been met by other new housing production. Assuming the OHPP would provide an incentive for office developers to contribute to a City housing fund as a means of meeting their requirement, these contributions would result in the addition of housing for low and moderate income households. These below-market units would represent a large share of the housing built under the OHPP. They would also represent a large share of the net additional units, because units of these types and in these price ranges would not have otherwise been provided. Overall, it is estimated that about 70 percent of the units built to meet the OHPP requirements would represent net additional housing in San Francisco under the Downtown Plan.

Housing requirements such as the OHPP increase the costs of doing business in San Francisco. Higher costs could reduce economic and employment growth. To the extent that there is less development, there would also be less housing production to meet housing requirements.

Evaluation of the OHPP indicates that it would not be likely to have a large effect on employment growth and business activity in the C-3 District under the Downtown Plan. However, it would result in somewhat less office employment growth./4/ The higher costs would have more effect on those businesses which are the most sensitive to space costs. The effect on C-3 District growth would be relatively small since many of the businesses there have strong preferences for a central, C-3 District location and are willing and able to pay higher rents to locate there.

A housing requirement would have more effect on economic activity and employment in locations outside the C-3 District. Generally, the types of uses located outside the C-3 District are more sensitive to the costs of space. Thus, higher costs for meeting housing requirements would have more effect on economic activity and development patterns there. If forecasts of office growth were prepared for San Francisco areas outside the C-3 District both with and without the OHPP, differences between them are likely to indicate that with the OHPP there would be lower total employment growth, more growth of business activity in space not covered by the OHPP (conversions, small projects), and more increase in activity in existing space (upgrading, changes in tenants, higher employment densities). Among the various types of office activities, it would be more difficult for larger-space-using functions to adapt to housing requirements than for smaller businesses which are better able to use space in existing buildings. For certain types of business activities, enacting housing requirements to mitigate housing impacts could be inconsistent with the mitigation measure for providing opportunities for lower cost space in areas south of the C-3 District.

Considering both the OHPP and annual limits on new office development, less office space growth and less growth of employment would result compared to the Downtown Plan forecasts without either program or to the scenarios with only one program, either the OHPP or annual limits. With the OHPP, the annual limits on office development would have more effect on housing production as well. Since housing would be required proportional to office development, housing development would be reduced to the extent that office space development is lower because of annual limits. The net addition of housing would also be affected proportionally.

Effects On Residence Patterns. With the OHPP, more housing would be produced in San Francisco relative to the growth of C-3 District employment under the Downtown Plan, and the number of C-3 District workers residing in San Francisco would be larger. This is because more housing would result in more employed City residents and more opportunities for downtown workers to reside in San Francisco. The percentage of C-3 District jobs held by residents would also be slightly higher. The number and percentage of C-3 District workers residing in other counties of the region would be lower with the OHPP than without it.

Comparison of the Plan with and without the OHPP to Alternative 1 (which incorporates no incentives or requirements for housing production) provides a means of evaluating the effects of differences in employment growth and housing production on residence patterns. Table V.D.1 summarizes the residence patterns forecasts for Alternative 1 (highest employment growth/ lowest housing production), the Plan without the OHPP (lower employment growth/higher housing production), and the Plan with the OHPP (lowest employment growth/highest housing production). The Plan with the OHPP is essentially the same as Alternative 5.

TABLE V.D.1: COMPARISON OF RESIDENCE PATTERNS FOR DIFFERENT C-3 DISTRICT EMPLOYMENT GROWTH AND CITYWIDE HOUSING PRODUCTION SCENARIOS

	Downtown Plan without OHPP	Downtown Plan with OHPP	Alternative 1
Number of Employed City Residents	2	3	1
Number of C-3 District Workers Living in San Francisco	1	2	3
Percent of Employed Residents Working in C-3 District	2	1	3
Number of C-3 District Jobs	2	1	3
Percent of C-3 District Jobs Held by City Residents	2	3	1

KEY: Among the scenarios shown above, "1" represents the lowest number or percentage and "3" represents the highest number or percentage.

NOTE: The Downtown Plan with the OHPP is essentially the same scenario as Alternative 5, which incorporated the OHPP.

SOURCE: Recht Hausrath & Associates

The relative ranking of any one set of policies depends on the outcome measured. For example, although Alternative 1 would result in a lower number of employed City residents than would the Plan with or without the OHPP (due primarily to the lower amount of housing produced under Alternative 1), the number and percentage of employed residents working in the C-3 District would be higher under Alternative 1, because of the relatively large amount of C-3 District employment growth under this Alternative.

Effects On The City's Housing Market. Although the number of households moving into San Francisco would increase, additions to the housing stock would result in somewhat less upward pressures on housing prices and rents than would occur under the Plan without the OHPP. With OHPP, more housing would be produced per additional C-3 District job. A larger amount of housing relative to job growth would reduce the competition for the City's housing supply thereby reducing upward pressure on housing prices and rents. During the 1980s and the 1990s, housing production in San Francisco without OHPP is forecast to result in more housing added per additional job than occurred in the 1960s and 1970s./5/ Other City policies and redevelopment programs would contribute to this outcome. With the OHPP, the "balance" between job growth and housing growth would be further improved.

If the OHPP provided an option to contribute to a City housing fund, it would result in housing of the types and price/rent ranges which would not otherwise be produced. These policies would not only add to the stock of housing, thereby reducing overall market pressure, but they would also improve opportunities for housing consumers who would otherwise have the greatest difficulty in a tight housing market. In what would be a relatively competitive housing market in all likely future scenarios, housing for low and moderate income people is unlikely to be provided by the private sector.

Other Housing Production Measures

There are other measures the City could use to encourage housing production besides the OHPP. These are outlined below. The most effective overall strategy would probably include a combination of these measures with joint public/private efforts.

- Encourage housing production by creating incentives for commercial developers. Such incentives could include allowing housing in office buildings above the base FAR. This policy is incorporated in the Plan for the C-3-G and C-3-S use districts. It could not be so easily applied in other parts of the C-3 District, but could be applied in commercial areas outside the C-3 District. Another type of incentive is an office space bonus for developing housing. The latter type of bonus would reduce the effectiveness of the Plan's historic preservation program (the TDR system), and both incentives could result in larger buildings than would otherwise be developed in the C-3 District. These measures are discussed in Section V.B, Land Use and Real Estate Development Mitigation.

- Take steps to increase the feasibility of and locations for housing development throughout the City. These actions could include: changes in zoning to allow higher densities of residential development in some areas; making surplus public property available for housing development; considering the legalization of secondary units as a part of existing housing; and considering reductions in the parking requirement for housing development. These types of actions are considered in the Residence Element of the City's Comprehensive Plan. Related steps might include the evaluation of the effect of other policies (such as rent control) on the production of housing in the City.

- Consider the use of tax exempt mortgage revenue bonds and other financing techniques (as may be available) to provide financing at below market rates and thereby stimulate the production of units that may not otherwise be built, at least not of the same types or at the same prices and rents. The City has already used these techniques effectively.

NOTES - Residence Patterns and Housing

/1/ These Plan forecasts on which these comments are based do not include consideration of the City's Office-Housing Production Program (OHPP). The OHPP is considered in the following subsection as a separate mitigation measure.

/2/ Residence Element of the Comprehensive Plan, April, 1983. Objectives and policies cited are found on pp. 2.1-2.3; implementing actions cited are found on pp. 3.2-3.5.

/3/ The OHPP consists of a formula which translates an amount of new office space to a requirement for a number of residental units. Applying the OHPP formula to the increase in office space in new office projects between 1990 and 2000 under the Downtown Plan results in a requirement for about 7,000 units.

NOTES - Residence Patterns and Housing

The OHPP allows developers to satisfy this requirement in several ways: by contributing to a City fund (if one exists at the time) for the production and/or rehabilitation of housing for low and moderate income San Francisco residents; by rehabilitating existing City housing, including residential hotels; and by building housing either as part of office projects or as separate developments. (The existing City fund program has been filled by contributions; it is assumed that the Board of Supervisors would establish other similar programs as needed in the future.) Assuming the OHPP would be structured such that contributions to a housing fund would be permitted and that the majority of developers would choose to satisfy the requirement in this way, credits for contributions to the housing fund could account for about two-thirds of the OHPP requirement. The costs of producing housing from the fund would result in considerably less than a one-to-one match between the credit and the number of units eventually produced in the City. This is the primary reason why the net addition of units due to OHPP would be less than the calculated requirement.

/4/ The comparison of employment forecasts for the Downtown Plan (without the OHPP) and Alternative 5 (which incorporates the OHPP) provides an indication of the possible effect of the OHPP.

Attributing all of the difference in employment to the OHPP may overestimate its effects, to the extent that there are other policies which differ between the Plan and Alternative 5 and which could contribute to higher employment growth under the Plan. An example would be the Plan's more effective TDR system for preserving architectural resources and redirecting new development.

/5/ This forecast depends primarily on the assumption that there would be substantially more housing added during the next 20 years than was added over the preceding 20 years. See Appendix I and Section IV.D for more discussion of the assumptions behind the housing production scenario.

E. TRANSPORTATION AND CIRCULATION

A major goal of the Downtown Plan is to accommodate the planned growth in downtown employment without adding to the number of commuter vehicles coming to and from downtown. The strategy for achieving this goal is based on two principal policies:

- increasing the number of commuters per vehicle; and
- increasing the number and percentage of commuters using transit.

The Plan establishes the following targets: increasing the occupancy rate for persons commuting by auto from 1.4 persons per vehicle to 1.6 persons per vehicle and increasing the percentage of workers commuting downtown by transit in the two-hour peak from 55% to 62%. The above target values were established on the basis of data previously developed for the greater downtown. This EIR has developed more recent and more precise data for the C-3 District. When the new data are considered, the Plan's Goals for ridesharing would call for the same overall 13.5% increase (i.e., 1.4 persons per vehicle increasing to 1.6 persons per vehicle). While the Plan's Goal for increased transit use by C-3 District employees would still have to increase by 13%, the overall levels of transit use would need to increase from 60% to 68%. If these targets are met, the additional employment will not result in an increase in commuter vehicles.

The Downtown Plan contains a number of implementing actions designed to carry out the strategies. It also calls for preparation of an annual growth monitoring report which would assess the effectiveness of the transportation policies. It also states that if the Plan policies and targets are followed, the projected growth rate can continue without adverse consequences. However, if the Plan, or proposals similar in nature or intent, are not followed, the growth rate may need to be slowed as a matter of deliberate public policy.

The Transit Development Impact Fee (Ordinance No. 224.81) became effective on June 5, 1981. The ordinance applies to projects approved after 1978. The ordinance requires a fee of five dollars per square foot of building area. The fee would be collected at the time of building occupancy for the purpose of providing funds for transit capital and operating costs. The incremental costs of new transit service to downtown required by office growth would be partially offset by these funds. The constitutionality and administration of the ordinance is being challenged by the development community. The lawsuit concerning this matter went to trial in late February, 1984. The fee would be borne by the individual developer and/or landowner, and would presumably be passed on to tenants in the form of higher rent. This could affect the amount of development, and thus employment, in the downtown. As the ordinance is in place, it was not proposed in the Downtown Plan nor analyzed further in this report.

Annual Growth Rate Limits

The possible effects on transportation of annual growth limits of 1.5 million square feet, 1.0 million square feet, and 0.5 million square feet on new office construction were examined. Since the method of allocating and applying any one of these effects is not known, some assumptions were necessary to determine the effects of the growth limits.

Reductions in office development under the growth rate limits are described in Section V.B, Land Use and Real Estate Development. The percent reductions in office space were developed as ranges with a 10% difference between the low and the high figure. The reductions in office space were considered to be applied citywide.

Since travel patterns for office development in locations other than the C-3 District are not well documented, it was not possible to determine the reduction in citywide trips. However, estimates of travel change were made by applying the reduction percentages directly to the number of C-3 District office employees. The total expected peak-hour person trip-ends and percent change from conditions expected without the annual growth limits are shown in Table V.E.1. If growth limits were in effect, the density of office employees per square foot (assumed to remain essentially constant for this analysis) could possibly increase, which would lessen the reduction in the number of trips shown in Table V.E.1.

Measures Proposed as Part of the Downtown Plan

The Downtown Plan offers a series of Policies and Implementing Actions that are designed to encourage transit use for commuting and/or to improve mobility within the C-3 District. Each of the Policies and Implementing Actions are described in detail in the Downtown Plan.

TABLE V.E.1: TRANSPORTATION EFFECTS OF ANNUAL GROWTH LIMITS, 1990, AND 2000 UNDER THE DOWNTOWN PLAN

	1990		2000	
Annual Limit(a)	Person Trip-ends(b)	Percent Change(c)	Person Trip-ends(b)	Percent Change(c)
1.5	193,000	-3.1	226,800	-0.5
1.0	187,800	-5.7	218,000	-4.4
0.5	182,700	-8.3	209,300	-8.2
No Limit	199,100	-	228,000	-

(a) Growth limit in million of square feet of offices
(b) P.M. peak-hour person trip-ends generated by office space only
(c) Percent change from No Limits, where No Limits represents the amount of office space that could be developed as reported in Section IV.B

SOURCE: TJKM Transportation Consultants, Environmental Science Associates, Inc.

Land Use Measures

Measure 1 would encourage the inclusion of housing in downtown commercial developments and the conversion of underused industrial and commercial areas to residential use.

1. Promote the development of high density housing on sites in or near downtown in order to reduce auto and transit travel requirements.

   Both the Residence Element and the Downtown Plan set targets for increasing the City's housing supply by 1,000 to 1,500 units a year. As existing neighborhoods cannot accommodate this many new units, much of the new housing proposed is to be located in or adjacent to downtown. Approximately 18,000 dwelling units could be developed in the Rincon Point-South Beach Areas, in Yerba Buena Center, along the Van Ness Avenue corridor, and on Rincon Hill.

The travel characteristics of these new residents are expected to be similar to those of the Golden Gateway Center. Of Golden Gateway Center residents, 70% walked to work and equal portions of the residents traveled to work by private cars or transit (12.5% each). The more housing that is produced in these close in areas, the fewer transit and auto impacts that would result from housing Downtown workers. This could materially assist in the achievement of ridesharing and transit use goals. This is essential to accommodate planned growth.

Transit Measures

Measures 2 through 12 would construct and maintain rail rapid transit lines from downtown to all suburban corridors and major centers of activity in San Francisco.

2. Carry out plans for expanding BART service.

Fund and implement Program Area B (Basic System Service and Capacity) of the Operational and Capital Improvement Program described in the 1983-1988 Short Range Transit Plan prepared by the Bay Area Rapid Transit District. This program would include the purchase of 150 new "C" cars, new on-board Automatic Train Control, construction of the Daly City Turnback/Storage Facility, enhancement of the Central Train Control computer to allow operation of up to 75 trains, completion of the third (KE) track in downtown Oakland in order to eliminate a capacity constraint in the system, and implementation of Primary Train Detection. The BART expansion program will not start until after 1986 because of the ongoing fire-hardening program. This program would provide the capacity increases assumed for the 1990 analysis of approximately 40% over 1981/82. This is essential to accommodate peak period demand due to planned growth.

To provide the capacity assumed in the year 2000 on BART, continued implementation of the enhancements to the Central Train Control Computer to allow the operation of 115 trains system-wide at 2.25 minute headways and continued acquisition of new and additional rolling stock would also need to be accomplished. This would result in an 80% capacity increase over 1981/82. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak period demand due to planned growth. These planned BART improvements would not be sufficient to accommodate its ridership within the system's recommended load factor. Additional rolling stock would be necessary to satisfy projected demand as well as absorb an estimated 1,300 motorists (who represent excess peak-period demand on the Bay Bridge).

3. Carry out plans for expanding CalTrain service.

Fund and implement the equipment acquisition plans shown in the 1983-1988 Five-Year Plan for the CalTrain Peninsula Train Service prepared by CalTrans. The equipment additions would provide the 1990 capacity levels assumed in this analysis. The estimated patronage assumed in the impact analysis does not include a downtown extension which would probably increase daily patronage by 11,000 trips a day (see Measure 9, below). The equipment additions are essential to accommodate peak-period demand due to planned growth.

4. Extend BART to the San Francisco International Airport.

The extension of BART to the San Francisco Airport without intermediate stations, would be expected to carry approximately 20,000 additional daily riders. Intermediate stations serving northern San Mateo County cities would be provided only if an equitable payment by San Mateo County to BART can be determined and accepted by both entities.

Extension of BART from the Daly City Station to the Airport with construction of intermediate stations would be expected to shift a greater share of Peninsula commuters to transit. Although it is accurate to state that BART extensions would increase the system's capabilities, it is not possible to fully assess systemwide or corridor service increases attributable to BART extensions. Specific increases would depend on the availability of parking, the number of cars per train and frequency of train service. Provision of adequate parking and SamTrans feeder service to the new stations would be necessary to insure maximal use of the BART extension. The feasibility of extending BART to the Peninsula would include the cost implications and political obstacles of a "buy in." The concept of a "buy-in" by San Mateo County into the Bay Area Rapid Transit District would be a major issue in any extension of BART to the San Francisco Airport.

In the long term, a BART extension could relieve commute congestion along the Peninsula corridor and on City streets. Parking demand attributable to Peninsula commuters could decline. This is a politically sensitive project that could take many years to accomplish. The extension to the airport would cost approximately 654 million dollars if BART directly serves the airport terminal; an extension to a remote intermodal terminal, would cost 340 million dollars. With intermediate stops, patronage could increase incrementaly to 66,000 riders. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC. The plan for the region's rail projects covers the next 16-year period (until the year 2000). This project would be implemented by BART. It would not compete, in terms of ridership, with the proposal to extend CalTrain service Downtown. San Francisco is represented on the BART board as are other elected members from Alameda and Contra Costa Counties.

5. Construct the Muni Metro turnaround at the Embarcadero.

This is Muni's highest priority rail project. The design would permit 48 trains per hour, an increase of 18 trains per hour over the 30 trains per hour that the system is designed to move. A turnaround loop constructed at the foot of Market Street (beyond the Embarcadero Station) would improve Muni Metro service reliability and reduce running times by facilitating LRV turnaround. Muni anticipates that the turnaround loop could save two to three minutes in operating time per trip. The time savings would also reduce inbound back-ups in the subway. The proposed loop could be constructed as a substitute project for the uncompleted segment of I-280. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC as a high priority project to be funded within the next six years. With the current fleet, actual passenger capacity on the Muni Metro would be increased from approximately 8,000 riders per hour to 13,000 riders per hour. Preliminary engineering is nearly complete. Final engineering drawings would be prepared over the next two years. This would allow construction to begin in 1987 or 1988. Environmental analysis for this project is covered in the I-280 Transfer Concept Program EIR/EIS. This project is essential to accommodate peak-period demand due to the planned growth.

6. Construct a Muni Metro extension to the vicinity of Fourth and Townsend Streets.

The extension of Metro service to Fourth and Townsend Streets would serve the approximate 10,000 dwelling units that could be developed in the Rincon Point/South Beach Redevelopment Areas and on Rincon Hill. It would also serve employees in the developing South-of-Market Area and CalTrain riders. Ridership on the extension is projected to be between 15,000 and 22,000 trips a day. This project would not provide duplicate service with the proposed CalTrain extension which would chiefly serve San Mateo County residents. The Metro extension would provide greater utility to San Francisco residents. Environmental analysis of the project is considered in the I-280 Transfer Concept Program EIR/EIS. Engineering work is expected to be prepared over the next year (1984-85). Construction is anticipated between 1985 and 1988. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC. This project could also be funded as a substitute project in the I-280 Transfer Program.

7. Examine alternatives for Muni Metro service to Geary/Third Street.

By nearly every measure, the Geary corridor is one of the busiest single transit lines in the region, with daily ridership of 55,000 trips. The impact analysis has shown future passenger loadings to the Northwest along the Geary Corridor to be at uncomfortably crowded levels. While additional demand can be accommodated by adding buses to the corridor, it would be desirable and cost-effective to replace motor coach service with Metro service. Conversion of the 38-Geary line(s) to Muni Metro service, with subway operation in the downtown area and surface operation elsewhere, could substantially improve service to the Northwest. This project is not essential to accommodate peak-period demand due to the planned growth.

Major new developments could occur along the Third Street or Bayshore Corridor which would substantially change the transit requirements for this corridor. The Bayshore Corridor Study is currently underway, with the primary purpose of determining the potential of Muni Metro service in the corridor. The Bayshore and Geary corridors are essentially two halves of a single North-South system that would complement the existing Metro and BART service. Provision of subway operation in the downtown would be desirable as surface operations through downtown would be subject to operational delays from pedestrian and traffic congestion. The construction impacts of a subway could extend over several years and the proposal would be quite costly. This measure would examine Alternatives for providing Metro service. All of the components of the process (with the exception of funding sources at the State or Federal levels) would be within the ability of the City to implement.

8. Initiate studies on the potential for light rail (Metro) rapid transit to Marin County.

   Light rail transit (LRT) service to Marin County (the North Bay) would provide increases in service over existing levels and may generate a shift to transit. An abandoned Northwestern Pacific railroad right-of-way extending from Corte Madera to Novato could be used as the basis of a North Bay LRT system. Golden Gate Transit proposes to use the right-of-way initially as an exclusive busway. This measure has been initiated by a multi-jurisdictional team. The Marin-101 Corridor Study has been underway since the end of 1983. The study includes a feasibility analysis for light rail transit in the corridor. The study area extends from San Francisco to the northern portion of Sonoma County (Healdsburg). The outcome of the corridor-feasibility study is beyond the ability of the City to predict. Any North Bay LRT system or other possible solutions for that corridor would have to be multi-jurisdictional, and as such, could not be implemented solely by the City.

9. Evaluate possible extension of Southern Pacific/CalTrain service.

   The extension of CalTrain (SPRR) service to a terminal closer to downtown is the subject of an on-going study. CalTrans has proposed a station location (underground, south of the Transbay Terminal) and a routing as part of the 1983-1988 Five-Year Plan for CalTrain. The I-280 Transfer Concept Program EIR/EIS is analyzing the extension of CalTrain service within the Alternative structure of the report. Electrification of the route is not presently being considered. A train terminal closer to downtown would be expected to attract approximately an additional 11,000 daily trips. Although it is accurate to state that CalTrain extensions would increase the system's capabilities, it is not possible to fully assess systemwide or corridor service increases attributable to CalTrain extensions. Specific increases would depend on both the size and frequency of train service. Additional ridership attributable to extension of service is expected to come primarily from the central and southern portions of San Mateo County and secondarily from Santa Clara County. This would reduce parking demand in San Francisco, and projected traffic volumes on City streets and on US-101 and I-280. This project would not compete, in terms of ridership, with an extension of BART to the San Francisco Airport. The extension would eliminate a transfer to Muni and would be expected to save commute time and cost. Construction of the extension would cost approximately 300 million dollars.

Implementation of the proposals would involve CalTrans, Southern Pacific Railroad, the California Public Utilities Commission, and federal agencies, as well as the City. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC. The ability to implement the extension is not within the control of the City.

10. Build the J-Line Connection to Muni Metro Center.

This project will increase operational efficiency of the Muni Metro system by reducing dead-heading (non-revenue producing travel of transit vehicles). Estimated operational savings are expected to be between $180,000 and $320,000 annually. Rail access to major activities centers would be improved. San Francisco State University, San Francisco City College, and Stonestown would have better cross-town transit service from Glen Park, Noe Valley and the Mission District. This project will improve system reliability by providing alternate routes in case of tunnel blockage. Preliminary engineering has been completed as a part of the EIR/EIS process. Final engineering is expected to be completed in 1985. Construction could begin in 1985 and be finished in 1987. The connection will allow the J and M lines to be combined as a single loop route. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC.

11. Build the BART extension to North Concord.

This project is described in BART's 1983-88 Short Range Transit Plan. This BART extension would extend 2.6 miles of track to North Concord and would provide better access to BART from the Martinez and Pittsburg areas and Solano County. Residential growth projected in these areas would be served by this extension. The extension would effectively add capacity to the Concord line which is presently operating at its current design limits. Although it is accurate to state that BART extensions would increase the system's capabilities it is not possible to fully assess systemwide or corridor service increases attributable to BART extensions. Specific increases would depend on both the size of trains and frequency of train service. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC, and would be implemented by BART. San Francisco is represented on the BART board, as are other elected members from Alameda and Contra Costa Counties.

12. Build a BART extension to Warm Springs in Fremont.

This project is described in BART's 1983-88 Short Range Transit Plan. This BART extension would add 5.7 miles to the Fremont line. BART has estimated that this extension would require 54 new vehicles in order to maintain headways. The extension would provide greater regional transit access to the southern portions of Alameda County and would serve the eastern portion of Santa Clara County. Employment and residential growth projected in these areas is expected to by served by this extension. This project is included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC. This project would be implemented by BART.

Measure 13 would expand the existing non-rail transit service to downtown.

13. Carry out plans for expanding transit service.

As discussed in the preceeding section and in Appendix J, each of the transit agencies serving San Francisco annually updates a Five-Year Plan that describes planned service improvements. The effects of implementing the Five-Year Plan proposals have been discussed in Section IV.E. This measure would support improvements that would be needed to expand non-rail service to downtown (rail service improvements are discussed above). The City has sole control over the Muni planning process and limited powers in the planning processes of BART, CalTrain and Golden Gate Transit. The City does not participate in service planning for AC Transit or SamTrans. These measures are essential to accommodate planned growth.

Muni

13a. Fund and implement the "Vehicle Plan" described in the 1983-1988 Short Range Transit Plan prepared by the San Francisco Municipal Railway. This vehicle acquisition program would increase trolley coach and motor coach Muni system capacity by 15% (over 1981/82) and would improve service and reliability prior to 1990. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak-period demand due to the planned growth.

13b. Fund and implement the "Vehicle Plan" described in Scenario XIII of Projections of Future Muni Demand and Vehicle Requirements, prepared by the San Francisco Municipal Railway. The increase for Muni would be about 24% between 1981/82 and 2000. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak-period demand due to planned growth.

AC Transit

Although no capacity improvements have been assumed for AC Transit transbay service, there would continue to be a need for funding and implementation of programs to replace and/or rebuild motor coaches to maintain overall fleet serviceability. As a matter of regional policy, AC Transit transbay service has not in the past been expanded to accommodate demand, nor will it be in the future. This policy may need to be re-examined if BART cannot increase its capacity before 1986. The construction of the East Bay HOV lanes (described in Measure 14) would improve transbay service running time.

SamTrans

13c. Fund and implement the proposed Capital Improvement Program for Vehicles, Facilities and Support Equipment described in the 1983-1988 Five-Year Plan prepared by the San Mateo County Transit District (SamTrans). Trunk-line capacity would be increased 50% by substituting articulated coaches for the standard coaches that are now used. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak-period demand due to planned growth.

13d. SamTrans plans to increase its capacity by about 2.5% per year between 1990 and 2000. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak-period demand due to planned growth.

Golden Gate Transit

13e. Fund and implement the Preferred Operating and Capital Plan described in the 1983/84-1987/88 Five-Year Transit Development Plan prepared by the Golden Gate Bridge, Highway and Transportation District. This program would expand commute bus service and would return the third Larkspur ferry to operation by 1990. This program would provide for the service increases assumed in the impact analysis. This is essential to accommodate peak-period demand due to planned growth.

13f. Golden Gate Transit plans to increase its capacity by about two percent per year between 1990 and 2000. This is essential to accommodate peak-period demand due to planned growth, and is assumed in the impact analysis.

Measure 14 would develop exclusive transit lanes on bridges, freeways and city streets where significant transit service exists.

14. Provide high occupancy vehicle (HOV) lanes on freeways and freeway on-ramps.

Exclusive HOV lanes would provide an incentive for increased ridesharing to downtown. CalTrans is considering several proposals to increase the network of HOV lanes in the Bay Area. One of these proposals would construct a new HOV by-pass lane eastbound on I-80 from the toll plaza to the interchange with Powell Street in Emeryville. While such a proposal would not alter the vehicular capacity of the Bay Bridge, it would provide an incentive for the use of carpools and vanpools. Development of exclusive transit lanes on bridges and freeways should be studied on an as-needed basis. This measure would be implemented jointly with Caltrans.

Measure 15 would coordinate regional and local transportation systems to provide for interline transit transfers.

15. Implement discount Muni transfers with all suburban corridor lines.

A major step in promoting transit use throughout the region would be the development of a common transit fare system, or regional transit pass, that would allow a passenger to transfer between systems without having to obtain a new ticket on each system. One approach would be to expand the existing system of discount transfers between Muni and the regional transit agencies to include Golden Gate buses and SamTrans service. There are currently two examples in place with the AC/Muni and SP/Muni discount transfer programs. For riders of these systems, the discount transfers provide a savings of $2.00 over the cost of two separate monthly passes. The discount transfer system requires operating agreements between Muni and the other transit agencies to allow an exchange of revenues. The Metropolitan Transportation Commission (MTC) would be involved in the agreements. A region-wide transit pass would require transit funding to be handled on a regional basis rather than on the current system of transit districts. A regional transit pass would reduce the cost and the complexity of a multi-system transit trip and would allow agencies that now provide competing service (Bart/AC, SamTrans/CalTrain, Muni/BART, Golden Gate, SamTrans) to optimize the structure of routes and service provided. Service to transit users throughout the region would be improved by the convenience and potentially reduced costs of interline transit transfers.

Past experience indicates that this could result in overall increases in daily ridership. The BART/Muni Fast Pass can be seen as a first project (under MTC's sponsorship) that provides for regional transit passes that are sold at the cost of a single pass. Eventually, a system of regional passes could be developed that would allow for interline transfers without any incremental costs to the patron.

Measures 16 and 17 would establish common or closely proximate terminals for local and regional transit systems to make convenient transfers possible; would provide for commuter bus loading at off-street terminals; and, where this is not possible, would provide curbside loading areas at non-congested locations.

16. Improve and expand the Transbay Terminal.

The Plan proposes that commute bus operations in the City be consolidated within the Transbay Terminal (currently used by AC Transit, although Golden Gate Transit and

SamTrans load from surface stops on streets adjacent to the Terminal). Loading at off-street terminals allows for sufficient area for ticketing, and passengers waiting, boarding, and unloading. This measure would reduce pedestrian and vehicular congestion on most sidewalks and streets Downtown, although, since pedestrian traffic would be concentrated at one location, it would necessitate construction of a pedestrian bridge over Mission Street (see Measure 43, below). Consolidation of the commute services to a single location would place greater demands upon Muni to serve as a distribution system for passengers. Both Samtrans and Golden Gate Transit passengers are now being served by many stops in the C-3 District. However, it is not likely that all of the Samtrans and Golden Gate Transit routes and stops would be housed at the Transbay Terminal. Complete consolidation of these services would not be seen as convenient or beneficial by the transit riders. It is assumed that at least for the near term (till 1990) the Terminal will operate much as it does today. While the City supports future operational improvements at the terminal, CalTrans has jurisdiction over implementation. The Transbay Terminal is a state-owned and operated facility. Operating agreements would have to be renegotiated, this would involve the transit agencies and MTC as well as the City. This project has completed its environmental review and is considered suitable as a substitute project in the I-280 Transfer Concept Program. The expansion and improvement of the Terminal would accommodate over twice the number of buses by constructing a second bus deck.

17. Moderate curbside on-street boarding of Golden Gate and SamTrans Service.

Commuter bus loading currently takes place curbside throughout the downtown. Waiting passengers sometimes cause sidewalks to be congested. This impact can be viewed positively, when one considers that this is caused by transit riders using transit. Rerouting plans and the designation of special curbside loading areas is within the ability of the City to implement. Agreements would have to be reached with the transit agencies regarding the stops and routes. Within portions of downtown, new routes need the concurrance of the San Francisco Board of Supervisors. Market Street is being considered as alternative route for regional carriers; because of its wider sidewalks and minimal auto conflicts, loadings and operation could be more easily accommodated. By rerouting Samtrans service from Mission to Market Street, loadings could occur without disruption of pedestrian flows or traffic operations. Similarily, Golden Gate buses could be rerouted from Howard and Folsom Streets to Market Street. This would result in better visibility for the carriers and could increase ridership by being more conveniently located for users.

Measure 18 would continue to encourage ferries and other forms of water-based transportation as an alternative method of travel between San Francisco and the rest of the Bay Area.

18. Initiate feasibility studies for additional public or private ferry service.

    Ferries offer an alternative means of travel to downtown. This measure would initiate feasibility studies of providing ferry service to East Bay and Peninsula locations. Any new system providing ferry service to and from other communities would be multi-jurisdictional; the City could not implement this measure alone. The City, through its participation in MTC, could initiate marketing studies that would allow private and public operators to determine whether new service is warranted. Alameda and Emeryville (in the East Bay) and Foster City and Redwood City (on the Peninsula) are all possible terminal site locations.

Measures 19 and 20 would give priority to transit vehicles where conflicts with auto traffic occur, and establish a transit preferential streets system to improve speed of transit travel and service.

19. Install and improve transit lanes on downtown streets.

    The improvement and continuing maintenance of transit-only lanes on City streets is the least cost solution for maintaining reliable transit service in the Downtown. Absent the committment to provide sufficient street space for transit vehicles and enforcement of transit lanes, subway construction may become a necessity. Muni has recommended the installation of transit contraflow lanes as a way of providing this space. Contraflow lanes are generally more self-enforcing than other treatments. The other major benefit is that a contraflow lane allows two-way transit service on what is, ordinarily, a one-way street.

    Muni has recommended that contraflow transit lanes be studied and implemented if appropriate, on the following streets:

    - Fourth Street between Townsend and Market Streets
    - Stockton Street between Market and Sutter Streets
    - Sacramento Street between Jones and Davis Streets
    - Hayes Street between Laguna and Polk Streets
    - McAllister Street between Hyde and Market Streets
    - Eddy Street between Cyril Magnin and Larkin Streets

- Sansome Street between Broadway and Pine Street
- Howard Street between Eleventh and Beale Streets

In order of importance, the following City streets that have been identified by Muni as suitable as Transit/Commercial Malls:

- Market Street between Van Ness Avenue and Steuart Street
- Geary Street between Taylor and Market Streets
- Second Street between Market and Townsend Streets

Of the three, Market Street has been studied the. Planning for Market Street has essentially been completed in previous studies. Proposals for Geary Street and Second Street would require separate analysis and are therefore not included in this discussion. Market Street currently carries portions of 17 Muni routes and could (if specific agreements can be reached) also carry all four Samtrans routes as well as Golden Gate Transit routes. Market Street has four moving lanes; as such, it could accommodate between 200 and 240 transit vehicles per hour in each direction. Similar approaches have been successfully used in other American cities. Portland and Minneapolis have had malls for approximately 10 years. San Jose is developing a transit mall to accommodate their new Guadalupe Light Rail system.

This measure would improve transit travel time and service for transit users. However, it would also reduce available capacity for automobiles on affected streets, and divert some portion of existing traffic to adjacent streets. The effectiveness of this measure would rely heavily upon (at least) continued levels of enforcement for parking regulations. The ability to implement and enforce this measure would be within the sole authority of the City.

20. Assess the desirability and feasibility of north/south shallow subways through the downtown.

Provision of subway transit operation in the downtown would remove existing surface transit lines through the downtown from the operational delays caused by pedestrian and vehicular traffic congestion. While additional demand can be accommodated by adding buses to these corridors or by improving transit preferential street treatments (including enforcement), it may be desirable and cost effective to operate north-south transit service in a subway. The construction impacts of the grade-separated facilities, although temporary, could extend over several years, and construction would be quite costly. This measure would examine physical alternatives, as well as the cost/benefit of providing grade-separated service. Candidate streets are First, Second, Third, Fourth, Stockton, Kearny, Montgomery and Battery Streets. All of the components of the process (with the exception of funding sources at the state or federal levels) would be within the ability of the City to implement.

Measures 21 through 23 would establish shuttle transit systems to supplement trunk lines for travel within the greater downtown area.

21. Implement Muni bus improvements for downtown circulation.

    Shuttle service, such as the 42-Downtown Loop route, provides a strong collection and distribution function in the downtown area. Reduced headways and/or increases in fleet allocation would help to achieve this measure. Muni in its Five-Year Plan has proposed to convert the 42 line to articulated coaches. This would represent a 60% capacity increase by 1990. This measure is essential to accommodate planned growth.

22. Refine proposals and implement the Muni "E" and "F" streetcar lines.

    The E-line would provide service between the major activity centers of Fort Mason-Fisherman's Wharf along the Embarcadero to the Southern Pacific Station at Fourth Street. The ridership market for this service is expected to be residents, shoppers and workers along the Waterfront. The F-line would operate on Market Street from Civic Center to Justin Herman Plaza, and then use the E-line right-of-way to the Fort Mason-Fisherman's Wharf area. The ridership for this service is expected to be similar to that of the E-line. Daily ridership (for both the E and F lines) is estimated to be up to 26,000 trips with a capacity of twice that figure.

    The E-line and a portion of the trackage necessary for the F-line are being analyzed as substitute projects in the I-280 Transfer Concept Program EIR/EIS. Engineering for both projects is expected to take over a year to complete (1984-1985). Construction (for both projects) is anticipated to begin between 1986 and 1989. These projects are both included in the "San Francisco Bay Area New Rail Starts and Extensions Plan" adopted by MTC.

23. Implement additional shuttle transit.

This measure would facilitate transit access within the greater downtown area as particularly needed between the Civic Center, financial and retail districts, and the Hall of Justice and other areas south of Market Street. If this service is provided by Muni, additional transit vehicles may be needed. The City would be able to implement this measure if public transit vehicles were to be used; if private service providers were involved, then agreements would have to be negotiated.

Traffic Measures

Measures 24 through 26 would be to maintain and where possible reduce existing automobile capacities of the bridges, highways and freeways entering the city.

24. Remove the Embarcadero freeway

The analysis for future years assumed the continuing use of the Embarcadero Freeway. Removal of the Embarcadero Freeway alone would result in increased congestion on City streets providing access to the Bay Bridge and the Peninsula. Local transit operating on these same streets would be affected by queueing at bridge access points. Alternatives are being considered that would construct a pair of replacement ramps which would mitigate much of the traffic impacts. The Embarcadero Freeway removal is the subject of the I-280 Transfer Concept Program EIR/EIS under preparation by CalTrans.

25. Reconstruct the Embarcadero surface roadway

Reconstruction of the Embarcadero surfaces roadway is essential if the Embarcadero Freeway is removed. The surface roadway improvements are being considered in the I-280 Transfer Concept Program EIR/EIS. The specific design treatments and construction for the roadway will depend on the selection of a preferred alternative in the I-280 Program. It would be possible to reconstruct the surface roadway whether the Embarcadero Freeway stays in place or is removed. The City has jurisdiction over planning and construction of the Embarcadero Roadway. The reconstructed roadway would provide better circulation in and around the C-3 District through channelization, signalization, and other operational improvements. Construction could begin as early as 1985.

26. Reconstruct the stub end of I-280

    This facility is owned by CalTrans and is currently a subject of the I-280 Transfer Concept Program EIR/EIS. The reconstruction of the stub end of I-280 and addition of a companion off-ramp are incorporated in the analysis for the EIR/EIS.

Measure 27 would encourage the downtown core to be an automobile control area.

27. Control growth of automobile traffic in the downtown core.

    This measure would not in itself mitigate traffic impacts, but together with other actions described throughout this chapter it would reduce and/or maintain existing street traffic conditions. This action can be monitored through the conduct of cordon counts of the Auto Control District and the greater downtown area on a regular basis. This would provide the data base to determine if growth of auto traffic had occurred and if vehicle occupancies were meeting targeted goals. In turn, the measure would determine the effectiveness for various other implementing actions included in the Plan. This would allow policy decisions and other actions to be taken if traffic growth were occurring.

Measure 28 would improve traffic circulation, reduce congestion in the core caused by through traffic, channel vehicles into peripheral parking facilities, and would locate drive-in, quick-stop and other auto-oriented uses on sites outside the commercial districts of downtown.

28. Channel auto traffic to primary vehicular streets.

    This measure would give priority to convenient and efficient movement of business clients, shoppers, and visitors as well as the movement of goods. While through traffic to destinations surrounding the downtown area would be reduced by diverting some of this traffic to surrounding streets, traffic volumes on primary vehicular streets would be increased by this measure. The locating of auto-oriented drive-in uses away from the most intensely developed C-3 District would reduce conflicts with pedestrian, transit and existing auto concentrations. It would be necessary to review and amend the Planning Code so as to make auto-oriented uses not permitted. The portions of the measure involving changes to the street system are within the sole authority of the City to implement.

Parking Measures

Measure 29 and 30 would discourage new long-term parking spaces in and around downtown; discourage surface parking as an interim land use, particularly where sound residential, commercial or industrial buildings would be demolished; and develop any new long-term parking facilities in areas peripheral to downtown.

29. Restrict new long-term parking facilities to the periphery of downtown.

30. Construct new long-term parking garages only as needed to replace the loss of long-term parking in the core. (See p. 124 of the Plan for five locations identified as appropriate for development of parking facilities.)

These two actions are complimentary to one another. Restricting parking within the core and building new garages on the periphery help reduce auto impacts on transit, freight and service access, and pedestrian movements.

If long-term peripheral parking is provided, additional vehicles would be expected to park outside of the C-3 District. The impacts of these actions would be to divert vehicles to parking in the peripheral areas. Parking could replace other possible land uses in surrounding areas. Measures 21 and 23, which would improve shuttle transit to the downtown, are necessary to ensure that the peripheral parking facilities would be attractive to C-3 District users. If commuters found the facilities unacceptable in terms of access or price differential they still may attempt to park in the C-3 District. If this occurred, competition for short-term parking spaces could take place.

These measures would contribute to minimizing the opportunity for automobiles to be used to accommodate the additions in commuter loads brought about by job growth in the downtown area.

To the extent that demand is not diverted wholly to transit or ridesharing, it could overflow into areas adjacent to the C-3 District and potentially into residential neighborhoods. Because C-3 District employees who live in San Francisco make up a portion of the overall parking demand (both present and future), one of the effects of limiting the amount of future parking may be changes in the travel habits of resident auto commuters. The employee survey (see Appendix F) has showed that approximately 10,000 City residents park in other nearby neighborhoods and transfer to Muni to reach downtown. Limiting future parking downtown may increase the frequency of occurence of this practice, unless measures such as the residential parking permit programs prevent it. The power to implement these measures rests with the City, although the property upon which the peripheral facilities would be constructed may belong to private parties or to the state. Another implementing action would be to set an upper limit on the number of spaces in both the auto control area and possibly in the periphery as well.

Measure 31 would include incentives for the use of transit, carpools and vanpools, which would reduce the need for new or expanded automobile parking facilities.

31. Provide preferential parking spaces and rates for carpools and vanpools.

This measure would contribute to a reduction in the number of single-occupant automobile trips into San Francisco, reduce congestion on streets and highways, conserve energy and reduce auto emissions. The Parking Authority has established a preferential parking program for vanpools. The City Planning Department requires preferential parking for carpools and vanpools in new or reconstructed facilities as part of an overall permit review. This measure would be administered by transportation brokers hired by downtown building operators and by RIDES For Bay Area Commuters as a ridesharing incentive. The City is investigating methods to implement this policy at existing private facilities. CalTrans provides HOV parking on State property; expansion of this program would require the approval and cooperation of CalTrans.

Measures 32 and 33 would convert all-day commuter parking to short-term parking in areas of high demand, or to carpool/vanpool parking where short-term parking demands are low, and would include needed additional short-term parking facilities in peripheral locations, around but not within the downtown core, adjacent to major thoroughfares.

32. Expand the Sutter-Stockton garage.

This garage serves an important function in downtown by providing short-term parking for shoppers and other visitors.

The effects of this measure are being analysed in the Sutter-Stockton Garage EIR. Construction could begin as early as 1985. The impacts analysis considered this project in the years 1990 and 2000.

33. Set parking rates to favor short-term parking.

Converting some long-term spaces to short-term would reduce the need for new short-term parking facilities. This action would further the goals of the Downtown Plan by discouraging commute auto trips into the core area and, as a consequence, encouraging transit use. This measure would ensure the retention of some short-term parking within the core area. The inter-relationship of long-term and short-term parking supply, parking cost, transit ridership, vehicular traffic, and roadway capacity (and congestion levels) is quite complex. Short-term parking availability in the C-3 District could be adversely affected by unsatisfied long-term demand. For parking cost to be effectively used as a tool to control automobile use in the C-3 District, the City might need to assume greater responsibility for hours of operation and rates for parking facilities in the greater downtown area (not just within the C-3 District). Within the existing downtown area, parking rates vary by location. For example, parking in the Civic Center is about half the cost of parking in the Financial District). Imposition of short-term rate structures in the core area could cause a migration of parkers to less expensive areas of downtown and ultimately to off-street parking in areas peripheral to downtown. The City currently has the authority to set parking rate structures in Parking Authority facilities. Control of rates in privately-owned facilities would be beyond the present authority of the City.

Measure 34 would make parking available to the general public for evening and weekend use.

34. Revise off-street parking requirements for mixed-use and commercial development.

Control of privately-owned facilities is beyond the present authority of the the City, although the City could secure compliance in the case of new accessory parking through the review and approval process of the City Planning Commission.

Transportation Systems Management Measures

Measure 35 would reduce the need for new or expanded parking facilities.

35. Require transportation brokers to be employed by each major new development or by groups of smaller projects in the downtown.

    The employment of transportation brokers is one approach to encourage alternative commute patterns. A model brokerage planning, feasibility, and implementation study has been completed for office buildings in the C-3-0 district. The next step in this process is to test the model brokerage program with a selected building in order to evaluate its effectiveness. An annual progress reporting process has been built into the program. Private sector participation is essential for full implementation of this measure. The effectiveness of a transportation broker is dependent upon the type of program available to be implemented and the amount of support available from employers and City sources. The City could implement this measure through the review and approval process of the City Planning Commission.

Measure 36 would maintain a taxi service able to serve the needs of the city and to keep fares reasonable.

36. Initiate a feasibility study for a second type of taxi service.

    Taxi service plays an important role in maintaining Downtown mobility, by providing point-to-point service without a commensurate parking need. The taxi feasibility study would evaluate current ridership, service and potential demand. The study could make recommendations as to fare structures, service to the airport, shared use of taxis by more than one passenger, new regulations, and the appropriate number of taxis in San Francisco.

    This measure would provide an essential supplement to the transit system for many residents and workers in the city who either do not have a car or find regular transit service inconvenient. This measure would also benefit elderly persons who rely on taxis and transit for many necessary trips. This measure could reduce parking demand in the auto control district and auto ownership of city residents. Development of a second type of taxi service would be within the ability of the City to implement. Regulatory changes (including licensing) would require an amendment to the City Charter. The service providers would be expected to come from the private business community and thus, the amount of service provided would be subject to market economies and regulatory action.

Measure 37, would include facilities for bicycle users in governmental, commercial, and residential developments, would accommodate bicycles on regional transit facilities and regional transportation links, and would include adequate and secure bicycle parking at transit terminals.

37. Improve bicycle access and facilities.

New and additional bicycle parking facilities would improve convenience for bicyclists and could encourage greater usage of bicycles for travel to downtown. The use of bicycles by commuters could be encouraged by allowing bicycles on regional transit. Adequate and secure bicycle storage facilities at transit terminals would improve access to transit terminals. Implementation of this action could be the purchase and installation of bike storage lockers at all rapid transit terminals in San Francisco. The City has the authority to require the provision of bicycle facilities in new buildings and rehabilitation of existing buildings. The ablitiy to implement the provision of bicycle facilities at existing land uses would be beyond the sole control of the City.

Freight and Service Access Measures

Measure 38 would provide adequate off-street facilities for freight loading and service vehicles in all new developments and would seek opportunities to upgrade facilities for old buildings.

38. Revise the provisions of the Planning Code regarding off-street loading.

For future construction, adequately designed off-street loading facilities could provide improved operations for service vehicles as well as other vehicles. If sufficient and convenient off-street loading spaces were provided, the number of double-parked vehicles could be reduced and improved traffic flow (including service vehicles) would result. This measure would contribute to a reduction in vehicular congestion on streets and would improve pedestrian circulation on downtown sidewalks. The City has the ability to implement this measure for new construction through the review and approval process of the City Planning Commission. Amendment of the Planning Code would be necessary.

Measure 39 would discourage off-street freight loading and service vehicle access from transit preferential streets or pedestrian-oriented streets and alleys.

39. Incorporate into the Planning Code rules regarding the appropriate location for off-street building service facilities.

    This measure would reduce conflicts between service/delivery vehicles and pedestrians where sidewalk crossings could be eliminated or minimized, and it could direct loading access away from either transit preferential streets or pedestrian-oriented streets and alleys. Conflicts with traffic on adjacent streets would be reduced where access could take place from alleys. The City has the ability to implement this measure for new construction through the review and approval process of the City Planning Commission. Amendment of the Planning Code would be necessary.

Measure 40 would require that new hotels provide off-street passenger loading and unloading of tour buses.

40. Incorporate requirements for tour bus loading into the Planning Code.

    Lack of off-street tour bus loading facilities in existing tourist hotels has caused significant disruption to pedestrian, traffic and transit operation. For future construction, off-street tour bus loading facilities would improve traffic flow by limiting curbside loading. This measure would contribute to a reduction in vehicular congestion on streets and would improve pedestrian circulation on downtown sidewalks. The City has the ability to implement this measure through amendment of the Planning and Building Codes. This is essential to accommodated planned growth.

Pedestrian Measures

Measures 41 and 42 provide space for pedestrian movement and lessen obstructions to pedestrian movement on sidewalks in the downtown core.

41. Implement proposals for arcades and through-block pedestrianways [as shown on Map 17 and listed on Figure 19 of the Downtown Plan].

Where warranted by pedestrian volumes, this measure could allow for the provision of additional pedestrian capacities using portions of street and parking lanes if necessary. Through-block pedestrian ways and arcades would also be developed in areas of highest pedestrian volumes. The City would be able to implement the portions of this measure that involve public streets or sidewalks; implementation of the portions of the measure that would involve private property would require the cooperation of private property owners.

42. Prepare and adopt clear-zone legislation.

Existing (and future) pedestrian movements are obstructed by mail boxes, newsracks, signs, etc. This crowding is particularly pronounced at the corners of the sidewalk area. Areas would be designated on all sidewalks corners to limit and carefully regulate the placement of all temporary and permanent obstructions to provide "clear zones" for pedestrians. Clear-zone standards are illustrated on Figure 20 of the Downtown Plan.

Conflicts with pedestrian movements would be minimized, resulting in smoother pedestrian flows. Also, sidewalk conveniences and amenities could be enjoyed more fully. This measure would provide sufficient space for pedestrians. The City would have the sole authority to implement this measure. This is essential to accommodate planned growth.

Measure 43 would provide convenient and safe pedestrian crossings.

43. Construct pedestrian bridges at the following locations:

- Over Mission Street between First and Fremont Streets;
- Over Mission Street between Third and Fourth Streets;
- Over Mission Street between Fourth and Fifth Streets;
- Over Howard Street between Third and Fourth Streets.

The Urban Design Element of the Master Plan provides guidance on the appropriateness of pedestrian bridges over public streets. The proposed bridges would eliminate existing and anticipated conflicts between pedestrians and vehicles. The bridges would be placed at high-activity locations where existing crosswalks and/or signal timing cannot adequately accommodate pedestrians.

The construction of the bridge over Mission Street near First Street is considered suitable as a substitute project in the I-280 Transfer Concept Program. This project has completed its environmental review.

The construction of the bridge over Mission Street near Third Street would be developed as part of the Yerba Buena Center Redevelopment Project. This project has completed its environmental review.

The proposed bridge over Mission Street between Fourth and Fifth Streets is needed to improve pedestrian safety and transit/traffic operation. This project would need the cooperation of private property owners on the north side of Mission Street.

The proposed bridge over Howard Street between Third and Fourth Streets is needed to provide safe crossing for the Moscone Convention Center. The project would be constructed as part of the Yerba Buena Center Redevelopment Project.

Construction of pedestrian bridges would improve safety by separating pedestrian and vehicle traffic. The bridge over Mission Street between First and Fremont Streets would improve the operating conditions (shown in Figures IV.E.4 and IV.E.5) at the intersection of Mission and First Streets. Where the proposed bridges would not affect private property, the City would have sole authority to implement the proposals; privately-owned parcels require the cooperation of the property owner(s). These projects are essential to accommodate planned growth.

Measure 44 and 45 would create a pedestrian network in the downtown core area that would include streets primarily for pedestrian use, and would improve the pedestrian environment.

44. Develop a pedestrian network.

45. Implement the improvement projects proposed for downtown streets and alleys.

The development of the pedestrian network shown on Map 17 of the Downtown Plan would facilitate pedestrian movements in and around downtown. As pedestrian access is the primary means of travel in downtown, and a major mode for close-in residents, this is important for accommodating planned growth.

More streets could be developed as transit, service or pedestrian malls which would improve mobility for transit passengers and pedestrians.

Measures 44 and 45 would aid in minimizing pedestrian/vehicular conflicts and enhance pedestrian access in the downtown area. They would also play some part in reducing the use of vehicles in congested areas. The ability of the City to implement these measures would depend upon the degree of cooperation necessary from the private sector. Through the review and approval process, the City Planning Commission would have control over pedestrian facilities at new developments. The City also would have control over proposals involving public streets and sidewalks, although restricting vehicular access to some privately-owned parcels would require consent of affected property owners.

Measures Identified by this Report and Other Sources, and Not Proposed as Part of The Downtown Plan

Transit Measure

46. Study the feasibility of a Van Ness subway.

The Municipal Railway has identified Van Ness Avenue as suitable for a subway study. A grade-separated transit right-of-way would improve transit speeds and capacity. It is premature to analyze the impacts of this measure as the study would identify the project effects.

Parking Measures

47. Prepare and adopt policies that would permit or require private developers to make cash payments (to a public agency) in lieu of providing on-site parking.

This measure is an alternate method of financing Measure 30 that would allow the City to cooperate with the private sector. The City would use the money to support peripheral parking near transit which would satisfy overall downtown planning objectives. Existing legislation (City Planning Code Section 161(g)) partially provides for this under exceptions to the parking requirement; however, a specific mechanism may not be fully in place. Two South-of-Market sites have been identified by the Parking Authority as desirable to build long-term parking facilities. Up to 6,600 spaces could be constructed on those two sites. The Planning Code would need to be amended if this method of financing is to be achieved.

48. Expand residential parking permit programs as appropriate in neighborhoods served by heavily-used transit routes, including areas near Muni Metro and BART stations.

This measure is an ongoing activity of the Department of Public Works. The impact of this measure is the protection of on-street parking in residential areas of the City. This measure is fully within the City's ability to implement, although it is incumbent upon the citizens of a neighborhood to request that the City implement residential permit parking programs.

49. Provide stricter time-limits regulation of on-street parking spaces in areas adjacent to the C-3 District.

This measure would attempt to retain on-street parking for South-of-Market visitors. It could be implemented by installing parking meters and limiting unmetered areas to one hour or less. This would require actions by the Department of Public Works and the Board of Supervisors, and would be fully within the City's ability to implement.

Transportation Systems Management Measure

50. Explore staggered work hours and compressed work weeks for employees in the downtown area.

Staggered work hours would help spread peak periods of traffic and transit demand, thus reducing the magnitude of peak congestion. Compressed work schedules (a four-day work week) would reduce weekly work and non-work travel and could also benefit peak-period travelers. While flex-time and staggered work hours could reduce transit operating costs by the spreading of the peak period, extensive practice of staggered work hours could adversely affect regional mobility. As a policy matter, the extension of the peak-period beyond two hours would conflict with the notion that face-to-face interaction is an important facit of downtown dynamics. Rather than requiring businesses and employers to consciously spread the commute hours of their employees, a modification of the mix of land uses in the downtown could achieve the same end without overt governmental intervention. The mix of land uses in downtown has resulted in the current employee commute pattern where 70% of workers actually travel in a one-hour period.

Freight and Service Access Measures

Measure 51 would coordinate freight deliveries and night-time deliveries to produce greater efficiency and reduce congestion.

51. Study the feasibility of a consolidated freight service system for downtown and the feasibility of night-time delivery services in Downtown.

There would be two features to such a study. The first would encourage the development of centralized freight facilities, which could function to consolidate delivery of various shipments to a given building and thereby reduce the overall number of delivery truck trips to individual office structures. The second would encourage concentrating delivery schedules in evening and night-time hours, thereby reducing traffic congestion caused by competing demands for use of street space during the work day.

This measure would aid in reducing conflicts between the number of vehicles making daytime deliveries and other vehicular and pedestrian traffic. The ability to implement this measure would require the cooperation of the business community, although the City could enact and enforce regulations that would govern the times of day that trucks could be present on City streets.

Measure 52 would study the needs for providing and enforcing additional on-street loading spaces to meet demonstrated need for peak period or short-term small deliveries and essential services.

52. Study on-street freight and service parking needs in the C-3 District.

This measure would aid in reducing peak-period traffic congestion and existing abuse in the use of loading zones, and would encourage use of off-street parking for lengthy deliveries and service. The ability to implement this measure would be under the control of the City.

F. COMMUNITY SERVICES

Solid Waste

Annual Limits on New Commercial Office Development in City

Application of annual office development limits to the City as a whole would reduce the rate of growth of solid waste generation from the C-3 District. Table V.F.1 projects solid waste generation from the C-3 District in 1990 and for the Downtown Plan in 2000, based on the assumption that the annual development limits shown are applied starting in 1984. It should be noted that solid waste generation from the C-3 District currently makes up about 13% of the total amount generated by the City (see Section IV.F.). Although projected C-3 District solid waste could be reduced by development limits, these reductions would likely not postpone the need for either new landfill sites or methods of disposal after 1988.

Mitigation Measures Identified By This Report

1. The Department of City Planning could require as a condition of project approval, through its discretionary and conditional use review processes, that new office and residential buildings include prominently marked and conveniently placed bins for collecting recycled materials, basement storage areas for recycled materials, and that building management implement a recycling program (including designation of a recycling coordinator). Of particular importance would be recycling of paper, which constitutes between 60% and 70% of the waste generated by office buildings. The materials in these recycling bins could then either be made available to the disposal contractor for pick-up and recycling, if such a program is available, or taken to local recycling centers by building management staff or recycling contractors.

2. Should separate collection of metals and glass become available citywide, the Department of City Planning could also require that food service operations be included in recycling programs.

3. The City's Refuse Collection and Disposal Rate Board could amend the Golden Gate Disposal Company's rate structure to favor buildings which have recycling programs.

TABLE V.F.1: C-3 DISTRICT SOLID WASTE GENERATION UNDER THE DOWNTOWN PLAN, WITH ANNUAL LIMITS ON COMMERCIAL OFFICE DEVELOPMENT IN SAN FRANCISCO

Annual Office Development Limit in City (million sq. ft.)	Solid Waste Generation (tons/year) (a)		% Reduction in C-3 District Solid Waste Generation	
	1990	DTP(b), 2000	1990	DTP(b), 2000
No Limit	88,110	95,020	-	-
1.5	86,410	94,850	2	0
1.0	84,700	92,640	4	3
0.5	83,000	90,260	6	5

(a) All numbers are rounded to the nearest 10 tons.
(b) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information provided by the Golden Gate Disposal Company.

Implementation of the above measures would slow projected increases (see Table IV.F.1) in San Francisco's solid waste generation, thus possibly extending the life of future landfill sites. These measures would conform with Board of Supervisors Resolution No. 884-79, enacted in September 1979, which encourages recycling, and would contribute toward the goal of the Final Draft Solid Waste Management Plan to increase recycling from a level of about 20% in 1983 to 25% by 1986, and to 35% in the long term.

4. The Board of Supervisors could amend the Building Code or other City Code to require all new Downtown buildings to provide bins and storage areas for recyclable materials. This measure would reinforce the measure outlined above.

5. The City could purchase balers (compactors) to reduce the volume of collected solid waste. Balers can compact solid waste from about one-half its original volume up to about one-tenth its original volume. Although this would reduce the overall volume of solid waste requiring landfill, it is likely to have only limited benefit for the City. The balers would be expensive, would use energy and would not reduce transfer truck trips, because transfer-truck capacity is limited by weight, not volume. Furthermore,

because landfill contracts and tip fees are based on total weight of the solid waste and years of use, landfill use by the City could only be extended if the terms of existing contracts were renegotiated. Compacting waste could conserve landfill space, increasing landfill capacity and thereby potentially increasing the economic return to the landfill operator and reducing future needs for new landfill sites. This measure has been removed from consideration, because its ability to increase landfill life is likely to be very small. Currently, solid waste is compacted by collection trucks, compacted further by dozers at the transfer station, and reduced again by compactors at the landfill site. Any additional benefit from balers would likely be minimal./1/

Police

Annual Limits on New Commercial Office Development in City

Application of annual office development limits to the City as a whole would probably have little effect on projected increases in annual criminal incidents in the C-3 District, because office space has among the lowest crime rates (annual incidents per square foot per year) of all Downtown San Francisco land uses (see Appendix K). Table V.F.2 shows how projected increases in annual incidents in the C-3 District would be affected by office development limits. The greatest reduction likely to be achieved, a reduction of about 120 incidents per year (for the 0.5 million sq. ft. annual limit applied to development between both 1984 and 1990 and 1990 and 2000), would be no more than one percent fewer incidents in the C-3 District as a whole in the year 2000./2/

Mitigation Measure Identified by this Report

The Board of Supervisors could amend the City Planning Code Use District designations for Subarea 5, the Tenderloin Subarea, to restrict the construction of major new retail uses there. Retail uses tend to offer the greatest opportunities for criminal incidents anywhere in the C-3 District, but particularly in the Tenderloin (see Appendix K). Although it is not possible to quantify the effectiveness of this measure, the following example illustrates its possible effectiveness. If it were possible to divert all of the projected new retail development between 1990 and 2000 in Subarea 5, under the Downtown Plan, (about 70,000 square feet) to Subarea 1, the projected increase in annual incidents associated with that retail space over that period could be reduced from about 40 incidents to about one incident.

TABLE V.F.2: PROJECTED CHANGES IN REPORTED CRIMINAL INCIDENTS PER YEAR IN THE C-3 DISTRICT UNDER THE DOWNTOWN PLAN, WITH ANNUAL LIMITS ON COMMERCIAL OFFICE DEVELOPMENT IN SAN FRANCISCO

Annual Office Development Limit in City (million sq. ft.)	Change in Reported Criminal Incidents per Year	
	1984 - 1990	Downtown Plan 1990 - 2000
No Limit	+731	+783
1.5	+689	+779
1.0	+647	+724
0.5	+605	+665

SOURCE: Environmental Science Associates, Inc., based on information provided by the San Francisco Police Department.

Fire

Application of annual office development limits to the City as a whole would have almost no effect on projected annual fire incidents in the C-3 District, because new high-rise office space has a very low incidence of fire incidents (see Section IV.F. and Appendix K). Because changes in non-fire incidents are more dependent on changes in population density than on density of building development, annual office development limits would have a small effect on reducing projected non-fire incidents (see Table V.F.3, below).

TABLE V.F.3: FIRE AND NON-FIRE INCIDENTS IN THE C-3 DISTRICT UNDER THE DOWNTOWN PLAN, WITH ANNUAL LIMITS ON COMMERCIAL OFFICE DEVELOPMENT IN SAN FRANCISCO

Annual Office Development Limit in City (million sq. ft.)	Annual Incidents in C-3 District				% Reduction in C-3 District Incidents			
	1990		DTP(a), 2000		1990		DTP(a), 2000	
	Fire	Non-Fire	Fire	Non-Fire	Fire	Non-Fire	Fire	Non-Fire
No Limit	1,290	6,445	1,295	6,527	-	-	-	-
1.5	1,289	6,427	1,295	6,525	(b)	0.3	0	(b)
1.0	1,288	6,410	1,294	6,503	0.1	0.5	(b)	0.4
0.5	1,288	6,392	1,293	6,478	0.1	0.8	0.1	0.7

(a) DTP: Downtown Plan

(b) Less than 0.1 %

SOURCE: Environmental Science Associates, Inc., based on information provided by the San Francisco Fire Department

NOTE - Community Services

/1/ Valerie Lenz, Director of Special Projects, Chief Administrative Officer's Office, telephone conversation, December 21, 1983.

/2/ Based on the estimate that about 23,000 incidents currently occur in the C-3 District annually.

G. ENERGY RESOURCES AND UTILITIES

Most of the mitigation measures described below would alleviate potential energy impacts upon future development under any development scenario. Some of the measures described would decrease the energy demand of existing structures.

Annual Limits on New Commercial Office Development in City

1. Applying annual development limits for office space to the City as a whole would reduce the rate of downtown growth. The incremental increase in demand for electricity, natural gas, and liquid fuels by the commercial and transportation sectors would decline in rough proportion to the reduction in new office development. The effect of this Citywide measure on reducing energy consumption related to downtown growth cannot be precisely determined. The estimated reductions in total incremental energy demand resulting from the development limits shown in Table V.A.1 are based on an assumption that the effects of the limits in the downtown would be proportional to the Citywide effects presented in Table V.A.1.

TABLE V.G.1: ESTIMATED EFFECTS OF CITYWIDE ANNUAL DEVELOPMENT LIMITS FOR OFFICE SPACE ON ENERGY DEMAND COMPARED TO UNLIMITED GROWTH IN 1990 AND 2000

	Reduction in 1990		Reduction in 2000	
Annual Limit	Energy (billion Btu)	% Change	Energy (billion Btu)	% Change
1.5 million sq. ft.	-740	-1.8	-110	-0.3
1.0 million sq. ft.	-1,400	-3.3	-900	-2.0
0.5 million sq. ft.	-2,000	-4.8	-1,600	-3.7

Measures Proposed as Part of the Downtown Plan

2. Measures incorporated into the Downtown Plan to protect and enhance solar access would also enhance opportunities for passive solar design and daylighting of buildings.

3. The Downtown Plan encourages new structures with light exterior facades. This would result in less solar heat gain of these structures compared to dark structures

and reflect more solar radiation back to the atmosphere, reducing the overall heat island effect created by high-density development in the downtown./1/

4. Measures to increase the extent of parks and other unpaved open space areas would also decrease the energy demand in the C-3 District by decreasing reflection of solar energy onto buildings and by decreasing overall air temperatures in the downtown. Studies show that interspersing lawns with concrete can lower air temperatures above these surfaces by up to eight degrees Centigrade./2/

Measures Identified by This Report

Measures Applicable to the Downtown Plan

5. The Department of City Planning and Board of Supervisors could require that all existing buildings from which development rights are transferred be brought up to current Title 24 energy conservation standards, to the extent structurally and economically feasible, as a condition of approval of such transfers. The economic feasibility of retrofit measures would be determined by a cost-efficiency formula to be agreed upon between the City and the project sponsor.

6. The Department of City Planning could incorporate energy conservation incentives into the Downtown Plan that would promote more efficient structures. Such incentives could, for example, allow a percentage increase in floor area proportional to the percentage reduction in the project's estimated per-sq.-ft. energy budget from its Title 24 performance standard. This type of incentive would satisfy the demand for new office space in the Downtown with more energy-efficient space than would occur under the proposed Plan. To avoid creating excessive allowable floor area ratios through such an incentive, basic floor area ratios could be adjusted downward and a limit put on the energy conservation incentive (for example, overall floor area ratios could be decreased by 20% and a 20% ceiling could be placed on the energy conservation floor area bonus). However, such a bonus program would not be supported by the Department of City Planning because it would affect the feasibility of implementing the Plan's TDR program. It would reduce the effectiveness of preserving architecturally significant buildings and would increase overall densities downtown.

Measures Applicable to Existing Structures (Applicable to, but not Limited to, Impacts of the Downtown Plan)

7. The Department of City Planning could require that all existing structures on sites of new projects be brought up to current Title 24 building energy conservation standards during project construction. This would reduce the energy demand in the C-3 District created by older, less energy-efficient structures. In effect, this measure would accelerate replacement of the existing, relatively inefficient building stock in the C-3 District with more efficient structures.

8. The City could require that a building's energy performance be audited prior to a change in its ownership and that the building be brought up to current Title 24 building energy conservation standards, if necessary. The results of the audit would be made available to the prospective buyer prior to close of sale. This would be similar to the Residential Energy Conservation Ordinance that went into effect in 1982.

   This measure would add energy efficiency to the scope of disclosure surrounding a sale of property, effectively including energy efficiency in the criteria applied by the buyer to determine the value of the building. This would reduce the emphasis on first costs in determining the value of energy conservation measures and would alert the new owner to the need to undertake corrective action. A study of 223 retrofitted commercial structures/3/ showed that energy savings averaged about 20%, at an average one-time cost of $0.62 per sq. ft.; savings for large offices averaged 23%. To avoid placing an excessive regulatory burden on small transcations where the potential for energy conservation would be minimal, this measure could apply only to buildings larger than a specified size, such as 100,000 sq. ft.

Measures Applicable to Future Development (Applicable to, but not Limited to, Impacts of the Downtown Plan)

9. The City could require that within 18 months of full occupancy each new building's energy performance be audited by PG&E or by another qualified energy consultant. The City could further require that the project sponsor agree to implement all cost-effective energy conservation measures recommended by the audit, according to a cost efficiency formula to be agreed upon between the city and the sponsor. Results

of the audit could be made available to the City to assist city staff in their evaluation of overall building energy conservation. This measure would ensure that the building, as constructed and operated, would be as efficient as intended by its design and that Title 24 building energy conservation standards would be satisfied.

10. The Department of City Planning could require that perimeter areas within 30 ft. of exterior walls be designed to use natural sunlight (daylighting) as their primary light source when such light is available. This measure is particularly effective for office structures, which are used mainly during the day, when natural light is available. Daylighting of perimeter areas could provide about 50% of total lighting demand for about 50% of total office occupancy hours./4/ For a highrise structure where perimeter areas within 30 ft. of the outside wall comprised about 60% of leaseable floor area, this would yield an overall average reduction in lighting demand of about 15%. If applied to all new construction in the C-3 District, this measure could reduce electricity demand in the year 2000 by about 20 million kWh per year.

11. The Department of City Planning could require that average installed lighting levels in new office structures be no higher than one watt per sq. ft. This measure would encourage task lighting, daylighting, high-efficiency lamps, and more efficient design of installed lighting systems while permitting flexibility in lighting design. In addition to reducing average lighting demand in office buildings by over 50%,/4/ this measure would decrease their air conditioning loads because some of the air conditioning load is caused by waste heat from lights. This measure may also increase the building's heating demand at times during the colder part of the year.

12. The City could require solar access provisions so that the developer of a new building depriving the solar access of an existing building both make compensatory arrangements and reduce their own projected consumption of depletable energy resources by an equivalent amount.

13. The Department of City Planning could require that sponsors develop a waste recycling plan, prior to project approval, that would indicate how paper, cardboard, aluminum, glass, and other recyclable materials comprising the bulk of wastes from the project would be recycled. The City could further require that the plan be

implemented when project occupancy exceeds 50%. This measure would reduce the volume of waste going to regional landfills and would recover most of the energy required to manufacture these materials.

14. The City could increase development fees to increase the budget of the Bureau of Building Inspection (BBI). This measure would allow the BBI to work more closely with developers on enhancing building energy efficiency and would permit greater participation by the BBI in state-sponsored workshops on building energy conservation. A key recommendation by the Citizens Energy Policy Advisory Commission in 1982 was that the BBI make Title 24 Conformance a priority in the building permit review process./6/

15. The city could prohibit electric-resistance heating in new commercial structures. This would decrease overall electricity use and slightly reduce peak electricity demand. This proposal is being considered by the Mayor's Commercial Energy Task Force.

16. Implement mitigation measures identified for transit impacts (see Section V.E) to also mitigate energy impacts. Increasing transit trips and decreasing automobile trips would reduce energy consumption.

NOTES - Energy Resources and Utilities

/1/ M. E. Hoffman, "Design of Solar Radiation and Thermal Capacity Influence on the Indoor Climate of Buildings," Energy and Buildings, 1982, Vol. 4, pp. 221-229.

/2/ F. Fezer, "The Influence of Building and Location on the Climate of Settlements," Energy and Buildings, 1982, Vol. 4, pp. 91-97.

/3/ H. Ross, and S. Whalen, "Building Energy Use Compilation and Analysis (BECA), Part C: Conservation Progress in Retrofitting Commercial Buildings," Energy and Buildings, 1983, Vol. 5, pp. 171-196.

/4/ R. R. Verderber, and F. Rubenstein, "Lighting Controls: Survey of Market Potential," Energy, 1983, Vol. 8, No. 6, pp. 433-499.

/5/ A. T. Kenworthy, "Observations on Climate and Building Design with Particular reference to Building Aerodynamics and Its Effects on Fuel Consumption in Multi-Story Dwellings," Energy and Buildings, 1982, Vol. 4, pp. 173-175.

/6/ Citizens Energy Policy Advisory Commission, 1981, Recommendations for Reducing Community Energy Costs.

H. ARCHITECTURAL/HISTORIC RESOURCES AND URBAN DESIGN

Annual Growth Limits

Annual limits on commerical office development in San Francisco would not in themselves affect the design of buildings or the relative economic preferabilities of development sites. Such limits would slow the rate at which new buildings were built, however, which in turn would slow the rates at which the urban design impacts identified in Section V.H would occur. In general, the rates at which these effects of new development upon demolition of historic resources, alteration of streetscape and pedestrian amenities, increased street-level winds and shadows, and introduction of new elements into the City skyline would occur would be reduced in proportion to the magnitude of the limit in effect (see Table V.A.1, p. V.A.2).

Architectural Resources

Measures Proposed as Part of the Plan

Measures 1 through 5 summarize the principal provisions of the Downtown Plan that would help preserve designated historic resources in the C-3 district:/1/

1. Reductions in height and basic FAR limits from those provided in the existing Planning Code would reduce economic incentives to demolish older buildings and would help create a market for the transfer of development rights from such buildings.

2. Demolition of 266 designated, architecturally significant buildings (Categories I and II) in the C-3 district would be prohibited, thus insuring their preservation indefinitely.

3. Transfer of unused development rights from 485 significant and contributory architectural resources (Categories I through IV) would be permitted, thus providing their owners opportunities for economic gain and incentives for preservation.

4. Conservation districts would be established to help protect the architectural quality and character of five specified areas.

5. Design review and conditional use procedures would be established to review and control the compatibility of new development in conservation districts and the appropriateness of alterations to significant buildings.

Measures Identified by this Report

6. Consider architecturally significant interiors, as well as exterior architectural design and continuity, as a criterion for categories of high significance./2/

7. Categorize some architectural resources that are not presently categorized in the Plan, and recategorize into different categories some of the resources that are presently categorized in the Plan, to make the lists more complete and to base the lists more consistently on a common technical rationale./3/

8. Prohibit sites with a demolished Category III or IV building to be receiver sites for TDRs in order to discourage demolition of these resources.

9. Encourage, through a statement of Plan policy, conformance with all parts of the Secretary of Interior's Standards of Rehabilitation in order to preserve National Register eligibility and maximum tax benefits for rehabilitation of significant buildings./3/ Clarify the proposed design review and discretionary review procedures to insure that City staff and decision-makers have the best preservation advice on how proposed alterations relate to national and City policies for alterations.

10. Maintain the authority of the Planning Commission to deny demolition of contributory buildings (Categories III and IV), and extend the discretionary authority of the Commission to demolition permits where significant or contributory resources would be affected./2/

11. Clarify and strengthen the role of the Landmarks Preservation Advisory Board in reviewing and commenting on alterations to significant and contributory buildings, maintaining conservation districts, reviewing National Register nominations for individual structures and districts, and interpreting standards for rehabilitation.

12. Amend Article 10 of the Planning Code to permit the Planning Commission, upon advice of the Landmarks Board, to deny demolition or inappropriate alterations to landmarks, and to provide authority for the designation of architecturally or historically significant interiors./2/

13. In order to preserve contextually important groups of buildings in the 300-block of Pine Street,/4/ and in the Market Street Loft/Theater District,/5/ establish conservation districts or redefine Category III to include buildings in these groups.

14. In order to help insure implementation of the Plan in a manner consistent with its intent, and the effectiveness of the mitigation measures identified above, clarify procedures for the following:

    - TDR authorization, recordation, permanence, and usability as a matter of right; and,

    - design review.

15. Create a program, to be administered city-wide or in specific areas by a City or Redevelopment Agency, which issues Marks Historical Rehabilitation Act Bonds/6/ in order to provide low-cost financing for the rehabilitiation of architectural resources.

16. Create a program for entering into historical property contracts, as provided by the Mills Act /7/, to provide financial assistance to owners of significant buildings by reducing property tax assessments in exchange for the owner's preserving and rehabilitating the structure.

17. Establish a Development Rights Bank under the sponsorship of the City or a quasi-public agency to: 1) create an initial market in TDRs, 2) solicit tax-deductible donations of TDRs, and/or 3) hold development rights to publicly owned architectural resources.

Streetscape and Pedestrian Amenities

Many buildings built in the C-3 District in the last two decades have been built to their maximum development potential with little attention to their effects on the streetscape and pedestrian environment. In light of the development that is forecast in this EIR, effective guidelines and requirements are necessary to retain and enhance the quality of the downtown street environment. Measures contained in the Downtown Plan for improving streetscape and pedestrian amenity are identified in Table IV.H.6, p. IV.H.35. Additional mitigation measures that may assist in this purpose include the following:

1. Establish specific design review guidelines to encourage pedestrian amenities, and make certain street environment amenities mandatory. Elements identified in Table V.H.6, p. IV.H.35, could provide a basis for such guidelines.

2. Include a floor area bonus program (in lieu of TDR) for upgrading neighboring public right of ways. Such a bonus could award additonal floor area in lieu of TDR for improvements recommended by planning staff, other City departments, the advisory board suggested in 2, above, or the Arts Commission, and approved by the City Planning Commission. Such a measure could make it economically advantageous for a project to contribute more to the streetscape and pedestrian environment than it otherwise could solely within the boundaries of the project site. However, such a bonus program would not be supported by the Department of City Planning because it would affect the feasibility of implementing the Plan's proposed TDR program. It would reduce the effectiveness of preserving architecturally significant buildings and would increase overall densities downtown.

Wind, Sun and Shadow

The Downtown Plan contains measures that would establish sun access criteria to ensure direct sunlight to certain public sidewalks (see Plan, p. 99); create sun access criteria for parks, plazas, squares and lunchtime malls (see Plan, p. 103); and modify building forms to reduce street-level winds in the vicinity of new buildings (see Plan, p. 104). The following would be refinements of these measures:

1. Develop specific statistical criteria for wind acceptability. Wind speed is variable, and is best described statistically. The eight mile-per-hour criterion in the Downtown Plan does not specify the applicable direction, time of day, or whether the criterion represents an average speed or some other statistical

parameter. Studies should be undertaken to develop a simple statistical criterion for windspeed that accounts for annual, daily and seasonal windspeed variations and for the variation of both wind speed and direction.

2. Develop appropriate methodologies and regulations for determining compliance with solar access guidelines. A simple manual or computerized method available to architects, environmental consultants, and city planners, would aid in evaluating impacts and developing sunlight mitigation. This would be particularly important in areas where height zoning potentially conflicts with sun access policies. A relatively simple method of evaluating numerous massing alternatives would be important in resolving these conflicts.

Skyline Image

The Downtown Plan would influence the skyline by permitting larger and taller buildings in desired areas (notably south of Market Street, east of YBC), by varying use, height and bulk districts, and floor area ratios, throughout the C-3 district. Proposed changes in the boundaries and other provisions of these controls would affect the future skyline by determining the maximum heights, bulks and configurations of buildings in each portion of the C-3 district. The heights, bulks and configurations of future development shown in Figures IV.H.16 and IV.H.17, p. IV.H.45, could be further altered by revising the controls embodied in the Downtown Plan.

The Plan also includes an implementing action that would prohibit the use of highly reflective materials and encourage the use of light-toned materials in new buildings.

Table V.H.1 shows the various general effects that continued highrise development may have on skyline image, and indicates whether the controls embodied in the Plan would contibute to controlling the effects.

TABLE V.H.1: SKYLINE IMAGE MITIGATION MEASURES AND IMPACTS MITIGATED

	Mitigation Measures			
Skyline Image Impact	Height and Area (FAR) Controls	Use District Revisions (indirectly determine maximum heights/bulks)	Bulk Controls (except shape and setback controls)	Controls for Shape and Setbacks at Upper Levels
"Benching" effect in building clusters	Yes	Yes	Yes	Yes
Uniformly rectilinear ("Square") building tops	No	No	No	Yes
Reduced variation in sky/building interface	Yes	Yes	Yes	Yes
Reduced sightlines through building clusters	No	Yes	Yes	Yes
Blockage of views from existing buildings	No	Yes	Yes	Yes
Conflicts with topographic forms and existing visual landmarks	Yes	Yes	Yes	Yes

SOURCE: Roger Owen Boyer and Associates and Environmental Science Associates, Inc.

NOTES - Architectural/Historic Resources and Urban Design

/1/ See Downtown Plan, pp. 63-78, for detailed discussion of measures 1 through 5.

/2/ The Foundation for San Francisco's Architectural Heritage, H. Grant Dehart, Executive Director, letter to Dean Macris, Director, San Francisco Department of City Planning, January 10, 1984. The letter and its attachments are available for public inspection at the Department of City Planning, 450 McAllister Street, 5th floor.

/3/ See attachments cited in note /2/, above.

/4/ The buildings include 340, 348, 358, and 369 Pine Street, and 217 Sansome Street.

/5/ The buildings include 1001, 1007, 1023, 1025, 1028, 1035, 1043, 1049, and 1063 Market Street.

NOTES - Architectural/Historic Resources and Urban Design (Continued)

/6/ The Marks Historical Rehabilitation Act of 1976 (Chapter 1345, California Legislative Service) allows issuance of tax-exempt bonds by the City for the purpose of historic building rehabilitation.

/7/ The Mills Act (California Government Code, Sections 50280-50290) provides for historical property contracts between the City and owners of significant buildings.

I. AIR QUALITY

Annual Limits on New Commercial Office Development in City

The air quality effects of annual Citywide office growth limits of 1.5 million square feet, 1.0 million square feet, and 0.5 million square feet would be proportional to the reductions in transportation and building energy use. These effects cannot be precisely determined, primarily because transportation and energy data for the City as a whole are unavailable. On the assumption that the growth limits would affect only downtown-related transportation and energy use, however, daily and peak-hour pollutant emissions would be reduced by the percentages shown in Table V.I.1. These emission reductions would not affect Bay Area ozone concentrations, because ozone impacts would reflect the imbalance between hydrocarbon and nitrogen oxides emissions, which imbalance would remain essentially unchanged. They would, however, reduce impacts on other pollutants accordingly.

Measures Identified by This Report

1. Implement mitigation measures identified for traffic impacts (see section V.E) to also mitigate air quality impacts. Increasing roadway capacity (where feasible and cost effective), reducing vehicular traffic through increased ridesharing (carpool, vanpool, and transit), and implementing flexible and/or staggered work hours would reduce local and regional emissions of all pollutants.

2. Implement mitigation measures identified for energy impacts (see section V.G) to also mitigate air quality impacts. Reducing natural gas combustion and electricity generation would reduce local and regional emissions of all pollutants.

3. Implement mitigation measures identified for housing impacts (see section V.D) to also mitigate air quality impacts. Improving the balance of jobs and housing in San Francisco would reduce long-distance home-to-work travel, and would reduce local and regional emissions of all pollutants.

4. Require project sponsors to sprinkle demolition sites with water continuously during demolition activity; sprinkle unpaved construction sites with water at least twice per day; cover stockpiles of soil, sand, and other such material; cover trucks hauling debris, soil, sand, or other such material; and sweep streets surrounding demolition and construction sites at least once per day to reduce TSP emissions. Require project sponsors to maintain and operate construction equipment so as to minimize exhaust emissions of TSP and other pollutants, by such means as a prohibition on idling motors when equipment is not in use, and a requirement for specific maintenance programs (to reduce emissions) for equipment that would be in constant use for much of a construction period.

TABLE V.I.1: EFFECT OF ANNUAL OFFICE GROWTH LIMITS ON POLLUTANT EMISSIONS, 1990 AND 2000

	Percent Change			
	Daily		Peak-Hour	
Annual Office Limit (million sq. ft.)	1990	2000	1990	2000
1.5	-2.0	-0.4	-3.1	-0.5
1.0	-3.6	-2.8	-5.7	-4.4
0.5	-5.3	-5.3	-8.3	-8.2

SOURCE: Environmental Science Associates, Inc.

J. NOISE

Annual Limits on New Commercial Office Development

Application of annual office development limits to the City as a whole would not measurably affect street noise levels shown in Table IV.J.2. Should no growth of any sort occur in the City between 1984 and 2000, noise levels shown in Table IV.J.2 would be reduced by no more than 1 dBA, a difference undetectable to the human ear.

Annual office development limits could, however, noticeably reduce construction noise in the C-3 District. Table V.J.1 compares the number of buildings which would be under construction simultaneously in the C-3 District both without and with office development limits.

TABLE V.J.1: FORECAST AVERAGE NUMBERS OF BUILDINGS SIMULTANEOUSLY UNDER CONSTRUCTION IN THE C-3 DISTRICT UNDER THE DOWNTOWN PLAN, WITH ANNUAL LIMITS ON COMMERCIAL OFFICE DEVELOPMENT IN SAN FRANCISCO

Annual Office Development Limit In City (million sq. ft.)	Average Number of Buildings Under Construction Simultaneously(a)	
	1984 - 1990	1990 - 2000
No Limit	27	14
1.5	23	14
1.0	18	10
0.5	13	7

(a) Based on an assumed two-year construction period for each building, and on the assumption that these buildings would contain total building areas similar to those of buildings currently under construction (Cumulative Office Development in Downtown San Francisco, September 15, 1983. This list is on file at the Department of City Planning, Office of Environmental Review, 450 McAllister St., Fifth Floor).

SOURCE: Environmental Science Associates, Inc.

Mitigation Measures Identified By This Report

The mitigation measures listed below are keyed to the major objectives of the San Francisco Plan for Transportation Noise Control, as listed in Table IV.J.1. The mitigation measures listed under each objective would further the attainment of that objective. All of the mitigation measures listed below would not only reduce (and possibly eliminate) the effects of development under the Downtown Plan, but would also reduce existing noise levels and the noise exposure of both existing and future downtown workers and residents.

Objective 1: Reduce Transportation-Related Noise

1. The Department of Public Works could place the highest feasible priority on maintaining the smoothest possible street surfaces throughout the downtown area. This would noticeably reduce traffic noise levels, and respond to Policy 3 under this Objective in the Plan for Transportation Noise Control (see Table IV.J.1).

2. The Municipal Railway could continue to expand the electric trolley network. The highest priorities should be given to hilly, residential routes, such as 2 Clement (on Sutter and Post Sts.), and the 1, 31 and 38 express bus lines on Pine and Bush Sts. This would respond to Policy 5 under this Objective in the Plan for Transportation Noise Control (see Table IV.J.1).

3. The Department of Public Works could systematically consider the noise effects of all street improvements. For example, street improvements which increase capacity and improve traffic flow (such as lights timed for traffic "pulses" on one-way streets), also increase traffic speeds, thus increasing traffic noise generation. Considering the noise effects of street improvements could respond to Policy 6 under this Objective in the Plan for Transportation Noise Control (see Table IV.J.1). However, any measures to reduce (or not improve) vehicle speeds downtown could adversely affect traffic conditions, local air quality and energy consumption.

4. All mitigation measures listed in Section V.E, Transportation and Circulation, which would reduce downtown traffic volumes (and/or traffic speeds), such as constructing parking at the periphery of downtown (and discouraging new parking within the downtown), and encouraging transit use, would also reduce transportation noise.

Objective 2: Minimize the Impact of Noise on Affected Areas

5. The Board of Supervisors, Department of City Planning and Department of Public Works could consider the designation of downtown auto-free zones in areas of heavy pedestrian use (such as Union Square).

6. The Downtown Plan would require upper-story building set-backs for solar access (to streets) and for reduction of wind effects. The Department of City Planning could augment these requirements by also requiring building set-backs in new buildings along streets with continuous facades on both sides of the street. This would help control "noise canyon" effects by reducing the building surface's ability to reflect noise.

Objective 3: Promote Land Uses that are Compatible with Various Transportation Noise Levels

7. The Department of City Planning and the Board of Supervisors could prepare an ordinance which would formalize the guidelines for new project land use compatibility and noise insulation studies contained in the Plan for Transportation Noise Control (see Figure IV.J.1).

8. The Department of City Planning could revise the Land Use Compatibility Guidelines contained in the Plan for Transportation Noise Control (see Figure IV.J.1) to specify acceptable interior noise levels, by use, in addition to acceptable exterior noise levels. Noise insulation features, if necessary, would then have to be sufficient to meet the target interior noise levels.

9. The Department of City Planning could encourage the construction of new housing in Subarea 3 along alleys only, and away from major streets.

10. The Department of City Planning could encourage the construction of all new residential uses in the C-3 District above the tenth floor only (where height limits allow), where street noise exceeds 70 dBA Ldn (see Table IV.J.2).

11. The Department of City Planning Could take advantage of the comparatively less noisy sections of Subarea 5 by encouraging the concentration of residential uses there.

K. SEISMIC SAFETY

None of the following mitigation measures is proposed as part of the Downtown Plan. A number of these measures would alleviate potential seismic safety impacts upon future development under any development scenario, while others are directed at improving seismic safety in existing structures.

Annual Limits on New Commercial Office Development in City

Application of annual office development limits to the City as a whole would generally reduce the rate of downtown growth, which, in turn, would reduce seismic hazards due to congestion and fall of material from new buildings. Development under the 1.5 million sq. ft. annual limit would not have a significant effect on seismic safety as compared with the Plan. The one million sq. ft. annual limit would reduce growth by 30-40% from that forecast under the Plan. The 0.5 million sq. ft. limit would reduce projected office development by 65-75% from that under the Plan. These reductions would: 1) reduce projected employee densities; 2) reduce the number of pre-code buildings that would be demolished; 3) possibly result in smaller structures (depending on permit allocation methods), and 4) reduce numbers of pedestrians during working hours. In general, these would increase seismic safety over the Plan. These limits would not affect residential seismic safety as projected under the Plan.

Measure Directly Applicable to the Downtown Plan

1. The Department of City Planning and Board of Supervisors could require that all older (pre-1949 Code) buildings from which development rights are transferred be brought up to current Building Codes as a condition of approval of such transfers.

Measures Applicable to Existing Structures and/or Future Development (Applicable to, But Not Limited to, the Downtown Plan)

2. The Board of Supervisors could authorize the assignment of additional building inspectors to determine which buildings pose the greatest threats of collapse in an earthquake, could restrict usage or reduce occupancy loads of these buildings until they are reinforced or replaced, and could have dangerous buildings posted to notify employees of hazards.

3. The Office of Emergency Services could prepare and distribute brochures detailing what to do and where to go in the event of a major earthquake. This brochure could be distributed to all residents of the City, and all building occupants in downtown San Francisco.

4. The Department of City Planning and Board of Supervisors could implement zoning designations that would preserve parks, surface parking lots, and other open spaces. These open spaces could be designated as 'safe zones' for gathering of downtown workers after a major earthquake.

5. The Board of Supervisors could upgrade applicable Building Code requirements for level of risk 3 structures (structures providing health and safety services) to ensure that no structural or major architectural (interior or cladding) damage would occur as a result of a major earthquake. This would protect pedestrians from potential effects of falling debris.

6. The Board of Supervisors could require that facade mounting and window cushioning should be adequate to absorb all movement of structures during a major earthquake (magnitude of 7 or greater on the Richter scale) without resulting in failure of cladding or windows.

7. The Board of Supervisors could upgrade the building code seismic design criteria to include the package of requirements proposed by the Bureau of Building Inspection in December 1983 and subsequently rejected by the Board of Supervisors. Key elements of this package are tailoring calculations of resistance to shear to specific building types, strengthening corner columns, placing certain restrictions on reinforced concrete structures, changing calculations for buildings with a "soft story" (a floor with no load-bearing walls), and requiring buildings with any exterior cladding that impacts the seismic characteristics of the building to be modelled with the cladding.

8. The Department of City Planning and Board of Supervisors could consider requiring new buildings in heavily used pedestrian areas to include arcades or rigid awnings to protect pedestrians from falling objects. Construction of arcades would require easements to allow work over the sidewalks. The Planning Code could be modified to facilitate such easements.

9. The Board of Supervisors could adopt an ordinance requiring the preparation of internal emergency response plans for medium- and high-rise buildings. Such plans should be prominently posted and distributed to building occupants.

10. The Department of City Planning could require that project sponsors provide emergency evacuation assembly areas within each new medium- and high-rise building as a condition of project approval. The Department could also require that building managers designate such areas in existing medium- and high-rise buildings.

11. The Board of Supervisors or Mayor's office could provide low-interest loans to private building owners to reinforce buildings determined to be potentially hazardous.

12. The Bureau of Building Inspection could institute a seismic safety inspection program for building construction and design. This program could inspect for: 1) design flaws; 2) inadequate materials; 3) poor construction practices; 4) failure to follow the design, materials and construction techniques called for in the building plan; and 5) failure to follow Building Codes. If deficiencies were found, the Bureau of Building Inspection could withold occupancy permits until deficiencies were corrected.

13. As part of the Comprehensive Plan, the Department of City Planning could prepare a Post-Earthquake Recovery and Reconstruction Fund Use Plan for specific uses of available Federal reconstruction funds.

14. The Department of City Planning could authorize a study of the performance of high-rise building friction-pile and mat foundations in subsidence-prone soils during a major earthquake. The results of this study could be used to revise the Building Code in accordance with the following two mitigation measures.

15. The Board of Supervisors could require that buildings proposed for sites mapped as having high liquefaction/subsidence hazards and very strong or severe seismic shaking potential be designed to higher earthquake-resistance standards than buildings constructed in safer parts of downtown. Building Code requirements could be adjusted by zoning districts to reflect different ground hazard areas.

16. The Planning Commission could require that Building Permits for large structures be issued based on an independent (Bureau of Building Inspection approved consultants) assessment of the seismic stability of foundations.

17. The Office of Emergency Services could expand its program of earthquake education. Lunch-hour sessions could be provided to office workers.

18. The Board of Supervisors, in coordination with the Office of Emergency Services could require semi-annual earthquake response drills for employees in all buildings with over 50 occupants.

VI. SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

The Downtown Plan would not change the principal types of land uses in the C-3 District. The Plan would permit continued growth of office, retail and hotel space, although at reduced annual growth rates compared to recent years. While increased employment in the C-3 District would occur under all alternatives and would result in increased use of all transportation systems, mitigation measures are available which would reduce otherwise significant transportation effects. While these measures are included as policies in the Downtown Plan, not all could be implemented solely by the City and County of San Francisco.

The additional development projected to occur under the Downtown Plan (or any other alternative) would result in increased travel to and from San Francisco which would cause violations to air quality standards (total suspended particulates and nitrogen oxides), with concomitant health effects, reduced visibility and, in combination with additional new development elsewhere in the Bay Area, increased formation of acid rain downwind. The additional development would also cause permanent loss of some architectural/historic resources in the downtown. The project is being proposed because development would be less dense, and there would be fewer unavoidable air quality and architectural/historic effects under the Downtown Plan than would occur under the No Project Alternative (Alternative 1).

The project would have a significant seismic safety impact, as it would accommodate higher population densities in larger buildings subject to substantial damage during a major earthquake, particularly in areas of unstable soils in Subareas 1 and 2. Available mitigation measures would improve the structural ability of buildings to withstand major seismic events, and continued development would replace non-seismically-reinforced buildings with buildings built to current code standards, thereby reducing some risk. However, greater concentrations of people would be susceptible to falling objects from buildings and would create congestion,impeding the access of emergency vehicles responding to earthquake-related emergencies. Implications of this seismic impact are described in Section IV.

All alternatives would result in similar exposure of people to seismic hazard. Therefore, eliminating this seismic impact would require redirecting all growth to areas of lower density and less seismic hazard. Accommodation of growth is being proposed, notwithstanding this impact, because social and economic considerations dictate against ignoring market forces for growth, which would mean maintaining the regulatory status quo with permanent moratoria. Further, environmental considerations, such as retaining regional open space and agricultural lands, dictate against encouraging urban sprawl as a defense against seismic hazard. Regional transit systems are presently directed mainly toward carrying people to and from downtown San Francisco during peak commute periods. Without major shifts in transit routes and schedules, redirecting growth would require more people to drive to work, as least for several years, thus increasing auto-related air emissions and energy use in the region.

VII. ALTERNATIVES

INTRODUCTION

In recent years, several groups and organizations, in addition to the Department of City Planning, have proposed alternative programs for managing downtown growth.

This section examines the following five such alternatives ("Alternatives"), and compares their features and effects to those of the Downtown Plan:

- Alternative 1 (the "Planning Code Alternative") consists of the C-3 District regulations, as described in the applicable sections of the present City Planning Code./1/

- Alternative 2 (the "Chamber of Commerce Alternative") consists of the Recommended Growth Management Program presented in Section 3 of the Downtown Growth Management Program, prepared by Bolles Associates and Livingston & Associates for the San Francisco Chamber of Commerce in October 1979./1/

- Alternative 3 (the "Proposition 'O' Alternative") consists of the proposed initiative ordinance, Proposition "O", which was defeated by San Francisco voters in November 1979./1/

- Alternative 4 (the "SFRG Alternative") consists of four of a series of five initiative ordinances proposed in 1980 by San Franciscans for Reasonable Growth (SFRG)./2/ The four initiatives would have amended the C-3 District regulations of the City Planning Code had they appeared on the ballot and been approved in the November 1980 election. Public notices of the intent to circulate the initiative petitions appeared on June 9, 1980. These notices, together with an explanatory letter prepared by SFRG, dated September 23, 1981, provide the full description of this Alternative./1/

- Alternative 5 (the "DCP Alternative") consists of the proposed development controls for the C-3 District presented in Guiding Downtown Development, issued by the Department of City Planning (DCP) in July 1982./1/

OVERVIEW OF ALTERNATIVES

The Downtown Plan and the other five alternatives represent six different approaches to managing growth in the C-3 District. Although the Downtown Plan is presented in this EIR in the form of a "preferred alternative," all six growth management alternatives received an equal level of analysis. The first five alternatives were analysed in detail in the Consultant's Report. The analysis of the Downtown Plan is presented in this EIR for the first time, with the remaining alternatives presented in the Alternatives Section of the EIR in more summary form incorporating by reference details from the Consultant's Report.

When viewed together, there is less variation among alternatives in terms of overall growth than might be expected. Based on comparison of forecast employment growth and the large number of projects under construction by mid-1982, approved by August 25, 1983, and planned for development in Yerba Buena Center, it was determined than no alternative would substantially affect the amount of development in the C-3 District until about 1990. The differences among all six alternatives are relatively small by the year 2000, whether the measure is space developed, employment, housing or transportation.

Employment forecast for the entire 16 years of the analysis period (1984-2000) ranges from a low annual growth rate of 1.7% (or an additional 86,700 jobs from 1984 to 2000) for Alternative 4 to a high annual rate of 2.03% (or an additional 106,300 jobs) for Alternative 1, with the other alternatives in ascending order: 5, Downtown Plan, 3, and 2. The forecast net increase in C-3 District space in all uses ranges from a low of 20% or about 21 million sq. ft. for both Alternatives 5 and the Plan, to a high of 27% or about 30 million sq. ft. for Alternatives 1 and 2, with Alternatives 3 and 4 falling in the middle of the range. These relatively small differences result in part from the fact that the amount of activity already existing in the area is large (about 280,900 employees and about 103 million sq. ft. in 1984) compared to the changes that might occur over the next 16 years. In addition, the strong underlying potential for economic growth in downtown San Francisco expected under any of the six alternatives is based on factors that are independent of City land use and zoning policies. Examples of these factors are: expanding regional, national and international markets for which San Francisco is already well-suited as a headquarters, financial and business service center; growth in Pacific Basin trade and business relationships; increased tourism and convention activity; and downtown San Francisco's established role as a primary retail location in the region.

The fact that growth would occur under any of the alternatives leads to the conclusion that building form, the locations of buildings and uses, open space, urban design, sunlight and wind are critical issues to be addressed by any proposal for managing growth in downtown San Francisco. The Downtown Plan is more detailed and demanding than the other alternatives in terms of location and form of new buildings, urban design, historic preservation and the other critical factors, in part due to the information made available in the analysis of the other five Alternatives in the Consultant's Report.

Any revision of C-3 District land use and zoning policies would have more effect on C-3 District patterns of development after the year 2000, as the market adjusted to the new requirements and as the resulting change became a larger fraction of the total development. Thus, the differences among alternatives in the distribution of growth to C-3 district locations, types of development and types of businesses would get somewhat larger over time. On the other hand, there are other factors operating which would act to reduce differences among the alternatives in the total amounts of space and employment, and their related impacts. Some of these factors are the following: the market would have had time to adjust to provisions in some alternatives redirecting growth to what had been less preferred parts of the downtown and those areas would become more successful in attracting a proportionally larger amount of development; those alternatives that act to improve amenities and attractiveness of the C-3 district could, over the long term, attract growth that would not be occurring at that later time under alternatives without those amenities.

The C-3 district would continue to be predominantly an office center, as well as a prime retailing location in the region and a significant tourist destination, regardless of which of the six alternatives is chosen for implementation.

ALTERNATIVE 1 AS THE NO PROJECT ALTERNATIVE

The "project" covered in this EIR could be described as a regulatory system for downtown San Francisco. Therefore, alternatives to the proposed project include different possible regulatory scenarios. The No Project alternative is, then, the regulatory scenario that would result if no action were taken to approve any new ordinances covering the C-3 District. The current City Planning Code regulations, which were adopted in their basic form in 1960, with major amendments in 1968, and which are analyzed as Alternative 1, would continue to apply. Alternative 1 is properly the No Project Alternative.

Other possible no project alternatives could be abolition of all land use regulation for the downtown (leaving building codes, fire safety and other public safety codes as the remaining controls); establishment of the status quo as the limit of development; or establishment of the interim controls limiting use of FAR bonuses as a permanent ordinance.

The City has had a City Planning Code with land use controls since 1921; the current Planning Code was adopted in 1960. Therefore, it is not considered reasonable or feasible to simply abolish all controls.

The regulatory status quo as an alternative would retain the amount and location of development described in the Setting sections of this EIR and would permit no additional development in the C-3 District. While there could be some increases in employee densities and some changes in uses in the C-3 District under this regulatory scenario, little or no square footage would be added and the overall effect in the District would be substantially the same as the situation described in the various setting discussions in Section IV. The regulatory status quo as an alternative would likely encourage increased office development in other Bay Area cities and counties, probably at least in and around downtown Oakland, San Mateo, Walnut Creek, Concord and San Jose, as these cities and their surrounding areas are experiencing the highest growth rates at the present time (ABAG, Projections 83).

If the scenario were limited to the C-3 District with no other controls on surrounding areas in the City, it would cause increased pressure to convert industrial space outside of Downtown to office uses and to build new high-rise office and hotel buildings, especially in the South of Market area, Chinatown and the Tenderloin, immediately adjacent to the C-3.

If major new office development were to occur outside San Francisco under a status quo scenario, new jobs that would have located in San Francisco would shift to other Bay Area locations. Commute distances would be shorter for many employees who otherwise would commute to San Francisco from the East Bay and Peninsula. Congestion on the Bay and Golden Gate Bridges, U.S. 101 and I-280 and on transit systems carrying passengers to downtown San Francisco would remain about the same as at present, or would be reduced if transit systems continued to improve service as planned and more commuters chose to use transit in the future. Under this scenario more workers would probably commute out of San Francisco to jobs on the Peninsula and in the East Bay; this "reverse commute" would not overload any of the bridges or freeways but could contribute to congestion on local streets near new development. Traffic and congestion and local air emissions would increase in the areas where large amounts of new office space were built to satisfy demand that would otherwise be satisfied by San Francisco space. Because most regional transit systems focus mainly on carrying people to and from San Francisco during peak a.m. and p.m. periods, many more employees might be driving to workplaces outside San Francisco than would drive to the City, at least for several years until transit systems were reoriented (assuming funding could be obtained to provide for peak commute to several regional employment centers at one time). No growth in downtown San Francisco could also increase pressure to develop open land in areas outside the City that would otherwise not have been developed within the time frame studied in this EIR.

The final possible no project alternative could be to establish as permanent the Interim Controls that became effective on July 1, 1983 (most recently extended to May 1, 1984) which limited use of floor area bonuses available under Planning Code Section 126 to residential uses. These Interim Controls would be an additional feature of Alternative 1, since they change only one provision of the Planning Code covered in that Alternative. Because the Interim Controls limit the use of bonus floor area, some buildings estimated for Alternative 1 would be smaller. For example, the average FAR for the C-3-0 District under Alternative 1 is projected to be about 17:1, whereas under Interim Controls the FAR would be limited to the base 14:1. However, much of the square footage projected for Alternative 1 would likely be built elsewhere in the C-3 District under Interim Controls, so land use and employment totals would be nearly the same as under Alternative 1. Visual impacts would be slightly different, as some buildings would be smaller than projected for Alternative 1, some amenities such as public plazas assumed for Alternative 1 might not be provided for some buildings, and pressure to demolish architecturally important buildings would increase slightly. Thus, in general, Interim Controls as an overlay to Alternative 1 would be quite similar to Alternative 1, with a few impacts related to location and distribution of uses and to visual effects somewhat more like those of Alternative 3.

Interim Controls have been in effect for a relatively short time, compared to the Planning Code parameters for the downtown area, and were always intended to be an interim measure. Therefore, they would not be appropriate to consider for a no project alternative.

Alternative I is labeled No Project in some cases, but should be read as the no project alternative throughout this Alternatives Section.

DESCRIPTIONS OF ALTERNATIVES

Table VII.I summarizes and compares the principal provisions of the Downtown Plan and the five Alternatives (see Introduction, p. VII.I). Table VII.2, page VII.19, compares the uses that would be permitted, conditionally permitted, and prohibited in each downtown commercial use district under the Downtown Plan and each Alternative.

Figures III.I and III.2, pages III.3 and III.9, show the use districts, and height and bulk districts, proposed under the Downtown Plan. Figure II.I, page II.5, shows the use districts proposed under Alternatives 1, 2, and 3; Figures VII.I and VII.2, pages VII.23 and 24, show the use districts proposed under Alternatives 4 and 5. Figures VII.3 through VII.7, pages VII.25 through 29, show the height and bulk districts proposed under Alternatives 1 through 5, respectively. (Text continues with "Reasons for Selection of the Preferred Alternative" on page VII.30, which follows page VII.K.3 in this section.)

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5

			Alternative				
Regulatory Parameter		Downtown Plan	1 Planning Code	2 Chamber of Commerce	3 Proposition "O"	4 San Franciscans for Reasonable Growth	5 Guiding Downtown Development
PART I: BASIC LIMITS ON FLOOR AREA RATIO, BULK AND USE CONSIDERED IN CONSTRUCTION FEASIBILITY ANALYSIS (SEE APPENDIX D) AND REAL ESTATE DEVELOPMENT FORECASTS (SEE APPENDIX G)							
1. Floor Area Ratio (FAR):	C-3-0	10:1 Basic; No Max. (a)	14:1 Basic; No Max.	12:1 Basic; 18:1 Max.	8:1 Basic; 14:1 Max.	7:1 Basic; 14:1 Max.	12:1 Basic; 17:1 Max. (d)
	C-3-R	6:1 Basic; No Max. (a)	10:1 Basic; No Max.	8:1 Basic; 12:1 Max.	7:1 Basic; 10:12 Max.	5:1 Basic; 10:1 Max.	6:1 Basic; 9:1 Max. (d)
	C-3-G	8:1 Basic; No Max. (a)	10:1 Basic; No Max.	8:1 Basic; 12:1 Max.	5:1 Basic; 8:1 Max.	5:1 Basic; 10:1 Max.	8:1 Basic; 12:1 Max. (d)
	C-3-S	6:1 Basic; No Max. (a)	7:1 Basic; No Max.	7:1 Basic; 10.5:1 Max.	5:1 Basic; 8:1 Max.	NA	6:1 Basic; 8:1 Max. (d)
	Other	6:1 Basic; No Max. (a,b)	NA	NA	NA	Varies (c)	8:1 Basic; 12:1 Max. (d)
2. Height Limits (Ranges of maximums in each use district are shown.):		See Figure III.2, p. III.9	See Figure VII.3, p. VII.20	See Figure VII.4, p. VII.21	See Figure VII.5, p. VII.22	See Figure VII.6, p. VII.23	See Figure VII.7, p. VII.24
	C-3-0	50 - 500 ft.	84 - 700 ft.	150 - 575 ft. (f)	84 - 260 ft.	150 - 575 ft.	84 - 700 ft.
	C-3-R	80 - 375 ft.	140 - 400 ft.	140 - 400 ft.	130 - 150 ft.	120 - 160 ft.	120 - 320 ft.
	C-3-G	70 - 320 ft.	70 - 320 ft.	70 - 320 ft.	70 - 130 ft.	70 - 240 ft.	50 - 320 ft.
	C-3-S	50 - 180 ft.	130 - 340 ft.	130 - 340 ft.	84 - 130 ft.	NA	84 - 550 ft.
	Other	60-450 ft. (e)	NA	NA	NA	40 - 575 ft.	30 - 220 ft.
3. Bulk Limits:		See Figure III.2, p. III.9	See Figure VII.3, p. VII.20	See Figure VII.4, p. VII.21 (f)	See Figure VII.5, p. VII.22	See Figure VII.6, p. VII.23	See Figure VII.7, p. VII.24
		In addition to the type of bulk controls described at right for Alternatives 1-4, The Downtown Plan would include a type of control (Bulk District "S") that would base bulk limits on building height, rather than height district. (g)	Boundaries of bulk districts conform to those for height districts for the Downtown Plan and all Alternatives. As shown in Figures referenced immediately above, bulk limits for all Alternatives generally consist of limits on maximum horizontal facade dimension (width) and limits on maximum horizontal plan dimension.				Alternative 5 includes bulk controls of the types described at left under both the Downtown Plan and Alternatives 1 through 4.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
4. Use Districts:	See Figure III.1, p. III.12	See Figure II.1, p. II.5	See Figure II.1, p. II.5	See Figure II.1, p. II.5	See Figure VII.1, p. VII.18	See Figure VII.2, p. VII.19
	Use districts in each Alternative are shown in Figures referenced immediately above. Uses permitted, conditionally permitted, and not permitted in each use district and Alternative are shown in Table VII.2, p. VII.15.					
	The Downtown Plan would revise use district boundaries as shown in Figure III.1, p. III.12. The Plan would create two new districts, the C-3-YBC and the C-3-0 (SD), and would exclude from the C-3 district portions of the North of Market and Chinatown (Subareas 5 and 7).	Alternatives 1 through 3 would contain identical use districts (C-3-0; C-3-R; C-3-G; and C-3-S) and use district boundaries.		and use district	Alternative 4 would modify use districts district into the boundaries generally to conform to a rezoning proposed for the Tenderloin area by the North of Market Coalition and to the use districts shown in the SPUR plan for the South of Market; and would extend the C-2 area of Jackson Square southward into the existing C-3. (h)	Alternative 5 would extend the C-3-R use present C-3-G use district in the vicinity of Kearny St., and would change portions of the present C-3-G and C-3-S use districts in the Tenderloin and South of Market areas to Residential/Commercial.
PART II: REQUIREMENTS AND FAR BONUSES RELATED TO HOUSING						
1. Development Requirements	None (i)	None	None	None	Office developer must provide for substantial rehabilitation of existing housing units or construction of new housing units at rate of one unit for every 4 employees in new office development. Affordability of new units must correspond to income levels of proposed office project occupants. OR income housing,	Developer of more than 50,000 sq. ft. of office space must provide 640 sq. ft. of housing for every 1,000 sq. ft. of office with minimum of approximately 0.9 units per 1,000 sq. ft. of office. Housing may be on or off office site; would be subject to City-wide requirements for providing low- and moderate-

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1. Development Requirements (Continued)					Office developer must pay in-lieu fee to City equal to no. employees x .25 x average down payment for S.F. housing unit. (Above formulas apply to total new office employment at site (including conversions); not to net new office employment at site.)	
2. Development Bonuses/ Allowances/Incentives	Housing in excess of that permitted by basic FAR would be permitted as conditional use in the C-3-S and C-3-G districts. Solariums would qualify as usable open space under the Planning Code; rear yard requirements for housing in mixed use districts would be waivable in some cases.	None	Allows office floor area bonus for net new housing construction up to maximum of 100,000 sq. ft. on a 1:1 basis for low- to moderate-income housing anywhere in City, and for market rate housing in C-3. Bonus for net low- to moderate-income housing in C-3 allowed on a 2:1 basis up to a maximum of 100,000 sq. ft.	Allows floor area bonus on 1:1 basis for net new housing construction; no maximum limit on bonus, but new housing must be within 500 ft. of office site. No additional bonus for low- to moderate-income housing.	Allows same floor area bonus as Alternative 2. Allows TDR for preservation of unsafe residential hotels through same mechanism as provided for preservation of "meritorious buildings" (see Parts III.1 and 2, below).	Allows additional FAR bonus for residential uses incorporated in residential or mixed office/residential projects in C-3 as follows: in C-3-0, 5:1; C-3-R, 3:1; C-3-G, 4:1; and C-3-S, 2:1.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
3. Additional Restrictions and Measures Related to Public Housing Policy	The Plan suggests that an ordinance regulating demolition or conversion of housing units in the C-3 district should be considered. The Plan also calls for implementing redevelopment plans that include housing; implementing zoning changes in areas outside the C-3 district that are subject to other City plans; maintaining existing controls on the conversion and demolition of existing residential hotel units; and studying rezonings of mixed-use residential areas that are or would be outside the C-3 district. (j)	None	None	None	City should protect and encourage residential uses adjacent to downtown from competing commercial encroachment (see Part 1.4, above).	City should expedite processing of housing projects; make City-owned land available for housing development; rezone certain areas near downtown to encourage housing development; protect residential uses adjacent to downtown from competing commercial encroachment (see Part 1.4, above); and change open space requirements, FAR calculations and rear yard requirements to encourage housing. (k)
PART III: RESTRICTIONS, ALLOWANCES AND INCENTIVES RELATED TO PRESERVATION OF ARCHITECTURAL RESOURCES						
1. Transfer of Development Rights (TDR) from Architectural Resources to New Development Projects	TDRs would be permitted on 1:1 basis from 4 "categories" of historic resources in any C-3 use district to new development sites in same C-3 use district, or from resource site in any C-3 use district to development site in new C-3-0 (SD) use district (Subarea 2). (l)	Allowed throughout City between adjacent sites, but only from City Landmarks. Maximum amount of transfer determined by unused basic FAR at transferor site on 1:1 basis.	Allowed from "designated historic or architecturally significant buildings" and Heritage A and B buildings within C-3, to other sites in C-3, on a 2:1 basis.	No allowance provided for TDR (see Part III.2, below).	Allowed from City Landmark or Structure of Merit anywhere in City to development sites in C-3, on a 1:1 basis.	Allowed from eligible resource (Architecturally and/or Historically Significant Buildings) in same C-3 districts, or to sites in "special development districts" (Study Areas 2 and 4). Maximum FAR of project in special development district may be increased to 12:1 by TDR from eligible site in C-3-0.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
2. Allowances and Incentives in Addition to TDR	None	None	Bonus for "preservation of 'A' buildings"; on 1:1 basis up to maximum bonus of 100,000 sq. ft.	Bonus for preservation "in perpetuity" of City Landmark or National Register Landmark (donor resource) within 500 ft. of donee site in C-3; 50,000 sq. ft. minimum bonus; 100,000 sq. ft. maximum bonus.	To "insure an effective incentive for preservation", the permitted basic floor area increase due to TDR may be further increased by 25%, up to maximum FAR.	To facilitate preservation and restoration of eligible resources, City Planning Commission may award bonus not to exceed public area of preserved/restored resource, plus 1/2 private area of resource.
3. Restrictions and Requirements Related to Protection of Resources at Development Sites and Architectural Resource Sites	Demolition of significant buildings (Category I and II) would be generally prohibited. Alteration of significant buildings would be permitted subject to guidelines. Demolition or alteration of contributory buildings (Categories III and IV) would be permitted, but if the contributory building is in one of five Conservation Districts, replacement building would be subject to design review. Alteration of a contributory building that adversely affects the qualities for which it was permitted TDR would make it ineligible for TDR. Once development rights were transferred from a contributory building alteration or demolition of the building would be regulated by the rules applicable to significant buildings. (m)	No upgrading or long-term protection of transferee resource is required; no protection of historic resources at transferor site is provided.	Same as Alternative 1	Donor resource (see Part III.2, above) must be "preserved in prepetuity"; no protection of historic resources at donee site is provided, except as shown in Part III.2, above.	Owner of transferor resource must guarantee its"permanent retention and maintenance"; no protection of historic resources at transferee site is provided, except as shown in Part III.2, above.	TDR from eligible transferor resource would not be allowed if development at transferee site would result in "destruction or defacement of another significant building"; TDR would be conditional on restoration and/or reinforcement of transferor resource, "if needed." No protection of historic resources at donee site is provided except as shown in Part III.2, above.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
4. Additional Measures Related to Architectural Preservation Policy	The landmark designation process established in Article 10 of the City Planning Code would be retained, but the landmarking function in the C-3 use districts would be shifted to buildings with special historic or cultural significance as distinguished from buildings with special architectural or environmental qualities. (n)	Preservation of Historic, Architectural and Aesthetic Landmarks, as provided in City Planning Code, Article 10.	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1, plus establishment of "conservation districts" with special requirements, including possible conditional use review. (o)

PART IV: ADDITIONAL REQUIREMENTS, ALLOWANCES, BONUSES, INCENTIVES, AND POLICIES RELATED TO URBAN DESIGN
(Key to Symbols: NA = Not Applicable; BA = Bonus Allowed (No Requirement), NRB = No Requirement, No Bonus Allowed)

1. Recreation and Open Space	The Plan would require usable indoor and outdoor open space, accessible to the public, as part of new C-3 development. Minimum ratios of usable open space to gross sq. ft. of new construction would be as follows: C-3-R, 1:100; other C-3 districts, 1:50. The open space provided could be located on the development site, or, under specified conditions, off site. Development rights from privately owned off-site open space could be transferred to new development sites, under specified conditions.	NRB (except see Parts IV.5 and IV.6, below)	NRB (except see Part IV.5, below)	Measures for "improvement of pedestrian environment" may be adopted, but are not specified.	NRB (except see Part IV.5, below)	Required; may be provided on-site or off-site in or adjacent to same C-3 use district. Required ratios of open space to floor area would be as follows: C-3-0, 1:25; C-3-R, 1:40, C-3-G, 1:30; C-3-S, 1:50.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
2. Art Works	Required; investment to be at least 1% of construction cost of project.	NRB	NRB	NRB	NRB	Same as Downtown Plan
3. Ground-Floor Retail	Required in all C-3 use districts.	NRB	NRB (but "should be encouraged")	NRB (but "could be adopted")	NRB	May be required by DCP in C-3-0, C-3-R, and C-3-G use districts.
4. Sunlight Access to Certain Public Spaces	Various sunlight access criteria are established for parks, plazas, squares, lunchtime malls and certain public sidewalks.	NRB	NRB (but "should be considered")	NRB (but "could be adopted")	NRB	Required; protection of sunlight penetration angles along certain streets provided.
5. Plaza	NRB (except see Part IV.1, above)	BA	BA	NRB (except see Part IV.1, above)	BA	See Part IV.1, above.
6. Observation Deck	NRB (except see Part IV.1, above)	BA	NRB	NRB (except see Part IV.1, above)	NRB	
7. Side Setbacks at Upper Floors	Required, see Part 1.3, above.	BA	Required	NRB	NRB	Controlled by bulk limits see Part 1.3, above.
8. Low Coverage at Upper Floors	Required, see Part 1.3, above.	NRB	BA	NRB	NRB	Required see Part 1.3, above.
9. Energy Conservation	NRB	NRB	BA	NRB (but "could be adopted")	BA	NRB

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
10. Other Urban Design and Streetscape Features	Streetscape policies (p) would be applied through a required design review process. Policies include: - excluding cornices and other decorative projections from measurements of maximum plan width and maximum diagonal dimension; - requiring rooftop mechanical facilities or other penthouse uses to be integrated into building design; - permitting visually interesting vertical attachments (such as flagpoles); - requiring setbacks and separation of towers; - requiring design review of wind speeds created by development projects; - building structures to the street property line along the entire frontage to a sufficient height for proper definition of street space; - providing setbacks above a building base to maintain the continuity of the predominant streetwalls along the street;	None	Institute design review procedure that would limit bank walls; provide special design treatment at street level; protect views and view corridors; and improve building access. Require design review.	NRB (except see VII.1, above)	None	Strengthen urban design standards; allow architectural projections; require street trees; encourage design of more interesting rooftops; and revise rules for calculation of floor areas to exclude non-structural exterior features.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
10. Other Urban Design and Streetscape Features (Cont'd.)	- maintaining and enhancing the traditional downtown street pattern of projecting cornices on smaller buildings and projecting belt courses on taller buildings; - using clear, untinted glass on the first two or three floors of buildings; - incorporating visually interesting details and ornamentation into the design of bases of buildings; and, - using interesting patterns and scale-giving features in any blank walls.					

PART V: ADDITIONAL REQUIREMENTS, ALLOWANCES, BONUSES, INCENTIVES, AND POLICIES RELATED TO TRANSPORTATION AND CIRCULATION (q)
(Key to Symbols: NA = Not Applicable; BA = Bonus Allowed (No Requirement); NRB = No Requirement, No Bonus Allowed)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1. Rapid Transit Access or Proximity	NRB	NRB	BA		NRB	NRB
2. Parking Access	NRB	BA	NRB	NRB (except bonuses that would improve the "pedestrian environment" or "encourage public transit usage" "could be adopted", but are not specified.)	NRB	NRB
3. Multiple Building Entrances	NRB	BA	NRB		NRB	NRB
4. Sidewalk Widening	NRB (except see Part IV.1, above)	BA	May be required, depending on existing sidewalk width.		NRB (except see Part IV.5, above)	NRB (except see Part IV.1, above)
5. Shortened Walking Distance	NRB	BA	BA		NRB	NRB

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
6. Transportation Facilities	Required increase in off-street delivery and loading facilities.	NRB (except as provided in Parts V.1 - V.5 above)	NRB	NRB	BA	Same as Downtown Plan
7. Other Implementing Actions Related to Transportation and Circulation (q)	Transportation-related recommendations of the Plan include the following: - constructing Muni Metro turnaround at the Embarcadero; - constructing Mune Metro extension to Fourth and Townsend SP/Caltrain terminal (r); - examining alternatives for Muni Metro service to Geary/Third Street (r); - carrying out plans for expanding transit service (r); - moderating curbside on-street boarding of Golden Gate and SamTrans service (r); - refining proposals for, and implementing, the Muni "E" streetcar line (r); - refining proposals for, and implementing, the Muni "F" streetcar line (r); - restricting new long-term parking facilities to the periphery of downtown (r); - building new long-term parking garages only as needed to replace the loss of long-term	None	Implement Transportation Systems Management Program including flextime, ride sharing, promotion of transit use, and parking management. Implement Downtown Transportation Improvement Assessment District.	Measures for "encouragement of public transit usage" may be adopted but are not specified.	None	City should implement "Transit First" policy. Building managers and employers should encourage transit use. Project sponsor should limit commuter parking, contribute funds for transit service, employ transportation broker, include bike and moped parking, contribute to transportation studies. City would establish three Downtown Parking Districts that would require new commuter parking to be in the periphery of downtown, and would seek the conversion of existing long-term commuter parking in the downtown core to short-term use.

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

Regulatory Parameter	Downtown Plan	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
7. Other Implementing Actions Related to Transportation and Circulation (q) (Cont'd)	- requiring transportation brokers to be employed for each major new development or by groups of smaller projects (r); - controlling growth and routes of downtown streets (r); - installing and improving transit lanes on downtown streets (r); - developing shuttle transit systems to supplement trunk lines (r); - revising off-street freight loading and service vehicle space requirements; - establishing requirements for tour bus loading (r); - establishing clear zone legislation (r); and, - implementing street improvement projects recommended for downtown streets and alleys (r).					

NOTES:

(a) The method for calculating FAR under the Downtown Plan would differ from the method prescribed in the Planning Code in two ways:

- ground floor uses would generally not be counted in the calculation of gross floor area; and
- gross floor area would generally be measured from the average line of window glass rather than the facade exterior.

See Note (a), Table III.1, p. III.3, for a full explanation of these proposed revisions to the Planning Code.

Alternatives 1 through 5 would employ the method of floor area calculation prescribed in the present Planning Code.

(b) See Note (b), Table III.1, p. III.3.

(c) See South of Market: A Plan for San Francisco's Last Frontier, San Francisco Planning and Urban Research Association, June 1981 (hereinafter, SPUR), p. 65, Areas 1, 3, 4, 5 and 8 for basic and maximum FARs.

(d) Maximum FARs shown include housing allowances; additional allowances may be permitted for historic preservation and urban parks (see Guiding Downtown Development, San Francisco Department of City Planning, July 1982 (hereinafter, GDD), pp. 5 and 30.

(e) The "other" use district proposed in the Downtown Plan would be the C-3-0 (SD) district (see Figure III.1, p. III.3).

TABLE VII.1: SUMMARY OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

NOTES (Continued):

(f) Alternative 2 would change height and bulk district boundaries and limits in C-3-0 district only. Height and bulk limits in other C-3 districts would be the same as in Alternative 1.

(g) See Table III.1, Part 1.3, p. III.3 for a detailed discussion of proposed bulk controls in bulk district "S."

(h) See Downtown EIR Consultant's Report, Environmental Science Associates, Inc., May 1983, Appendix B, pp. B.4. 8-11 for detailed descriptions of Tenderloin and South of Market use district modifications; see Appendix B, pp. B.4.3. for C-2/C-3 use district modifications.

(i) The Downtown Plan recognizes that the Office-Housing Production Program (OHPP), a City program separate from the Downtown Plan, would require construction or rehabilitation of housing as a condition of approval of development projects (see Plan, p. 3). The OHPP requirements are similar to those described in this table, Part II.1, under Alternative 5.

(j) See Plan, pp. 42-47.

(k) See GDD, pp. 24-28 for detailed descriptions of policy measures.

(l) See Plan, pp. 66-73.

(m) See Plan, pp. 69, 71, 74-78.

(n) See Plan, p. 73.

(o) See GDD, pp. 30-31 for descriptions of conservation districts.

(p) See Plan, pp. 106-109.

(q) See Plan, pp. 118-143, for policies and implementing actions summarized in Part V. Additionally, the Plan calls for these actions involving other jurisdictions: (1) extending BART to San Francisco Airport; (2) initiating studies on potential for light rail (Metro) rapid transit to Marin County; (3) evaluating possible extension of SP/Caltrain service; (4) implementing discount Muni transfer with all suburban corridor lines; (5) improving and expanding Transbay Terminal; (6) initiating feasibility studies for additional public or private ferry service; (7) tearing down the Embarcadero freeway and reconstructing as a surface roadway; (8) reconstructing the stub-end of I-280; and (9) providing high-occupancy vehicle lanes on freeways and their on-ramps.

(r) These implementing actions are based on existing Master Plan policies; these policies would be applicable to any Alternative, although not all Alternatives discuss implementation.

SOURCE: Environmental Science Associates, Inc.

TABLE VII.2: USES PERMITTED IN PRIMARY STUDY AREA, BY USE DISTRICT AND ALTERNATIVE (a)

Planning Code Reference Section(s) (d)	Summary Description of Major Uses Permitted (d)	Use Districts(b) (and Alternative(s) in Which Each Appears) (c) Downtown Commercial							Community Business	Residential-Commercial Combined					Special Mixed Use	
		C-3-0 (DTP, 1-5)	C-3-0 (SD) (DTP)	C-3-Om (4)	C-3-R (DTP, 1-5)	C-3-G(e) (DTP, 1-5)	C-3-Gm (4)	C-3-S(f) (DTP, 1-3,5)	C-2 (4)	RC-3m (4)	RC-4 (4)	RC-4m (4)	RC(1) (5)	RC(2) (5)	S(1) (4)	S(2) (4)
	RESIDENTIAL USES															
209.1(a)-(m), 215(a) and (b).	Dwelling (with restrictions on density and/or no. of units)	P	P	P	P	P (g)	P	C (h)	P	P	P	P	P	P	P	P
209.2, 216.	Group Housing (with restrictions on density and/or no. of units)	P	P	P	P	P	P	C	P	P	P	P	P	P	P	P
209.2(a) and (b), 216(a).	General (including Residential Hotel)	P	P	P	P	P	P	C	P	P	P	P	P	P	P	P
209.2(c), 216(a).	Medical and Educational	P	P	P	P	P	P	C	P	C	C	C	C	C	P	P
	Transient Hotels															
209.2(d), 216(b).	5 rooms or fewer	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
209.2(e), 216(b).	6 rooms or more	P	P	P	P (i)	P	P	P	P	C	C	C	C	C	P	P
216(c) and (d).	Motels	N	N	N	N	P	P	P	P	N	N	N	N	N	-	-
	INSTITUTIONAL USES															
209.3(a), 217(a).	Hospitals	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	Residential and Child Care Facilities:															
209.3(b) and (e), 217(b) and (c).	6 or fewer patients/12 or fewer children	P	P	P	P	P	P	C	P	P	P	P	P	P	P	P
209.3(c) and (f), 217(b) and (c).	7 or more patients/13 or more children	P	P	P	P	P	P	C	P	C	C	C	C	C	-	-
209.3 (g)-(j), 217(f)-(j).	Schools and Churches	P	P	P	P	P	P	P	P	C	C	C	C	C	-	-
209.4(a) and (b), 221(a)-(f).	Community Facilities, Halls and Theaters	P	P	P	P	P	P	P	P	C	C	C	C	C	-	-

TABLE VII.2: USES PERMITTED IN PRIMARY STUDY AREA, BY USE DISTRICT AND ALTERNATIVE (Continued)

Planning Code Reference Section(s) (d)	Summary Description of Major Uses Permitted (d)	Use Districts(b) (and Alternative(s) in Which Each Appears) (c)															
		Downtown Commercial							Community Business	Residential-Commercial Combined					Special Mixed Use	
		C-3-0 (DTP, 1-5)	C-3-0 (SD) (DTP)	C-3-Om (4)	C-3-R (DTP, 1-5)	C-3-G (DTP, 1-5)	C-3-Gm (4)	C-3-S (DTP, 1-3,5)	C-2 (4)	RC-3m (4)	RC-4 (4)	RC-4m (4)	RC(1) (5)	RC(2) (5)	S(1) (4)	S(2) (4)
	RETAIL SALES AND PERSONAL SERVICES															
209.8(a) and (c), 218(a) and (b).	Ground floor or below (with restrictions)	P (j)	P (j)	P	P (k)	P (l)	P	P (m)	P	P	P	P	P	P	P	P
209.8(b) and (d), 218(a) and (b).	Above ground floor (with restrictions)	P	P	P	P	P	P	P	P	C	C	C	C	C	-	-
209.8(a)-(d), 219.	OFFICES (Professional and Business)	P	P	P	P (n)	P	P	P	P	N(o)	N(o)	N(o)	N(o)	N(o)	P	C
226(a).	LIGHT MANUFACTURING (with restrictions and exceptions)	P	P	P	P	P	C	P	N	C	N	C	N	N	C	P
	PARKING															
209.7(a) and (c), 223.8	Parking lot, privately owned	C	C	C	C	C	C	P	P	C	C	C	C	C	C	C
209.7(a) and (c), 223(m) and (n).	Parking garage, privately owned, completely enclosed	C	C	C	C	C	C	C	P	C	C	C	C	C	C	C

TABLE VII.2: USES PERMITTED IN PRIMARY STUDY AREA, BY USE DISTRICT AND ALTERNATIVE (Continued)

NOTES - Table VII.2

(a) The explicit or inferred status of each use listed in the Table, for each use district and Alternative shown, is indicated by the following symbols: "P" = Principally Permitted Use; "C" = Conditionally Permitted Use; "N" = Use Not Permitted. A blank ("-") indicates that the status of a use is neither explicit nor reasonably inferred from the description(s) of the applicable Alternative(s).

Under the Downtown Plan, portions of the existing C-3-0 use district would be placed in a new Chinatown Mixed Use District and a new C-3-YBC use district; portions of the C-3-G use district would be placed in a North-of-Market Mixed Use District; and portions of the C-3-S use district would be placed in Public use districts. As comprehensive forecasts of future development outside the C-3 use district under the Downtown Plan are not presented in this report, permitted uses outside the C-3 use district under the Downtown Plan are not presented in this table. As comprehensive development forecasts for areas that would remain in their present C-3 use districts (and the area that would change from C-3-S to C-3-0 (SD)) under the Downtown Plan are presented in this report, the uses that would be permitted in these areas under the Plan are presented in this table.

(b) Use districts are described as follows:

(1) C-3-0: Downtown Office District (see Planning Code, hereinafter, Code, Section 210.3, p. 104)
(2) C-3-0 (SD): Downtown Office District (Special Development) (see Downtown Plan, hereinafter, Plan, p. 27)
(3) C-3-0m: Downtown Office District with Housing (see SPUR, South of Market: A Plan for San Francisco's Last Frontier, hereinafter, SPUR, June 1981, p. 64)
(4) C-3-R: Downtown Retail (see Code, p. 105)
(5) C-3-G: Downtown General Commercial (see Code, p. 105))
(6) C-3-Gm: Retail, Entertainment, Offices and Housing (see SPUR, p. 67)
(7) C-3-S: Downtown Support (see Code, p. 105)
(8) C-2: Community Business (see Code, p. 104)
(9) RC-3m: Moderate Intensity Residential-Commercial (see SPUR, pp. 65 and 66)
(10) RC-4m: High Intensity Residential-Commercial (see SPUR, pp. 65 and 66))
(11) RC(1): Industrial and Residential/Commercial (see Department of City Planning, Guiding Downtown Development, hereinafter GDD, July 1982, p. 26)
(12) RC(2): Residential-Commercial with Provision for Protection of Existing Apartment and Residential Hotel Uses (see GDD, p. 28)
(13) S(1): Mixed Use Housing and Commercial (Offices) (see SPUR, p. 66)
(14) S(2): Special Low Intensity Mixed Use (see SPUR, p. 66)

(c) Downtown Plan is indicated by the symbol "DTP", Alternatives 1 through 5 are indicated by corresponding numeral(s).

(d) See Planning Code Reference Section(s) in left column of Table for complete descriptions of major uses. See also Planning Code for complete descriptions of other uses not listed in Table, as follows: Sec. 209.5, Open Recreation and Horticulture; Sec. 209.b, Public Facilities and Utilities; Sec. 209.7, Vehicle Storage and Access; 209.9 and 227, Other Uses; Sec. 220, Laundering, Cleaning and Pressing; Sec. 221, Assembly and Entertainment; Sec. 222, Home and Business Services; Sec. 223, Automotive; Sec. 224, Animal Services; Sec. 225, Wholesaling, Storage, Distribution and Open-Air Handling of Materials and Equipment; Sec. 226, Manufacturing and Processing.

(e) Under the Downtown Plan, conversions from residential use would be permitted by conditional use only (see Plan, p. 35).

TABLE VII.2: USES PERMITTED IN PRIMARY STUDY AREA, BY USE DISTRICT AND ALTERNATIVE (Continued)

NOTES - Table VII.2 (Continued)

(f) Under the Downtown Plan, conversions from residential use would be permitted by conditional use only (see Plan, p. 36).

(g) Under the Downtown Plan, residential uses in excess of basic allowable floor area would be permitted as conditional use up to height and bulk limits (see Plan, pp. 33 and 40).

(h) Under the Downtown Plan, residential uses in excess of basic allowable floor area would be permitted as conditional use up to height and bulk limits (see Plan, pp. 36 and 40).

(i) Under the Downtown Plan, hotels of 200 rooms or more would be permitted as conditional use; hotels of less than 200 rooms would be permitted as of right (see Plan, p. 32).

(j) Under the Downtown Plan, retail uses would be required on ground floor (see Plan, p. 29).

(k) Under the Downtown Plan, retail uses would be required on ground floor (see Plan, p. 32).

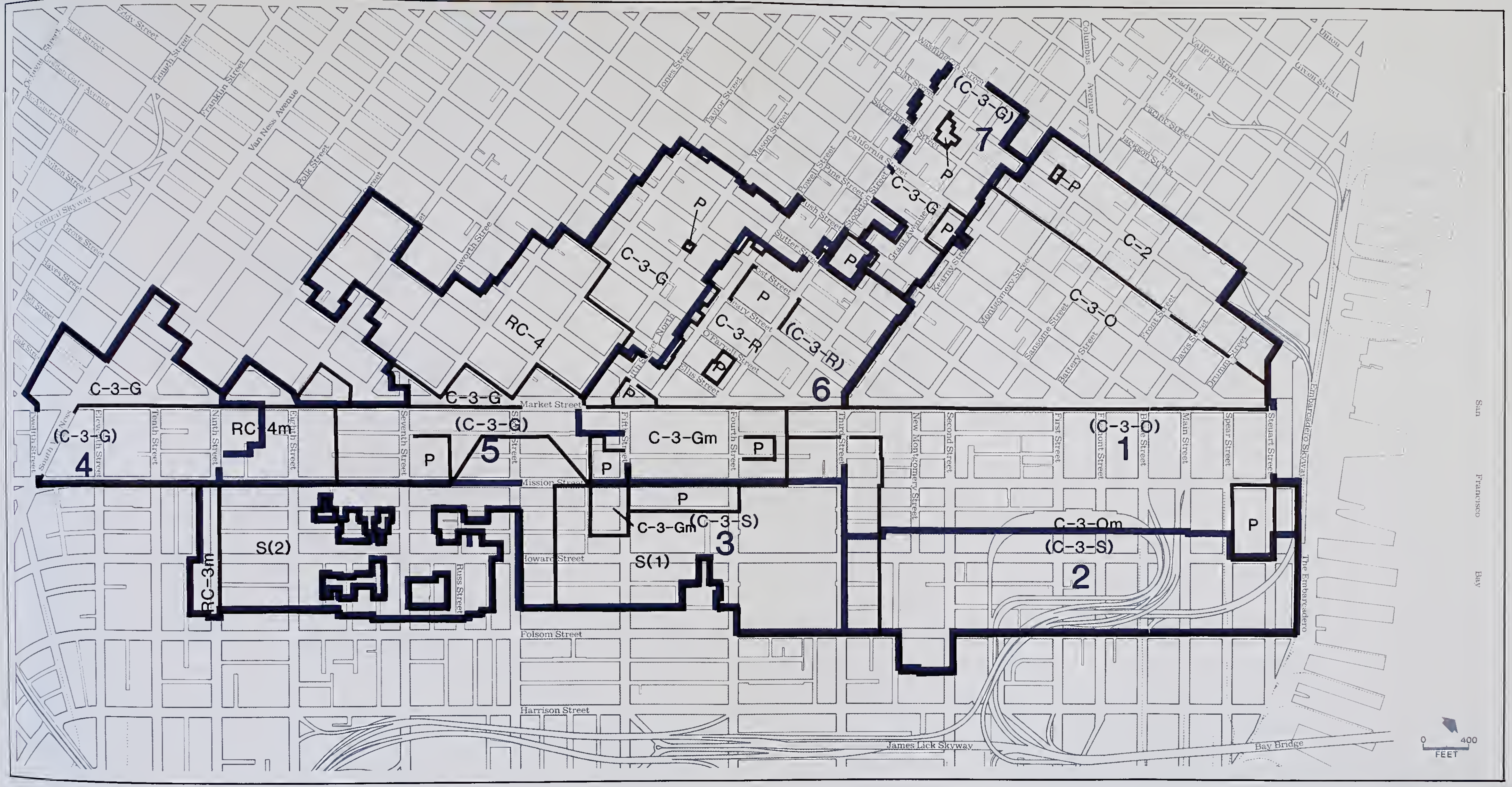
(l) Under the Downtown Plan, retail uses would be required on ground floor (see Plan, p. 35).

(m) Under the Downtown Plan, retail uses would be required on ground floor (see Plan, p. 36).

(n) Under the Downtown Plan, office uses in excess of 10,000 square feet would be permitted as conditional use; office uses of 10,000 square feet or less would be permitted as of right (see Plan, p. 32).

(o) Except as may be permitted or conditionally permitted under Planning Code Section 209.8, Commercial Establishments. This section of the Planning code permits ground story offices as a principal use and offices above the ground story by conditional use.

SOURCE: Environmental Science Associates, Inc.



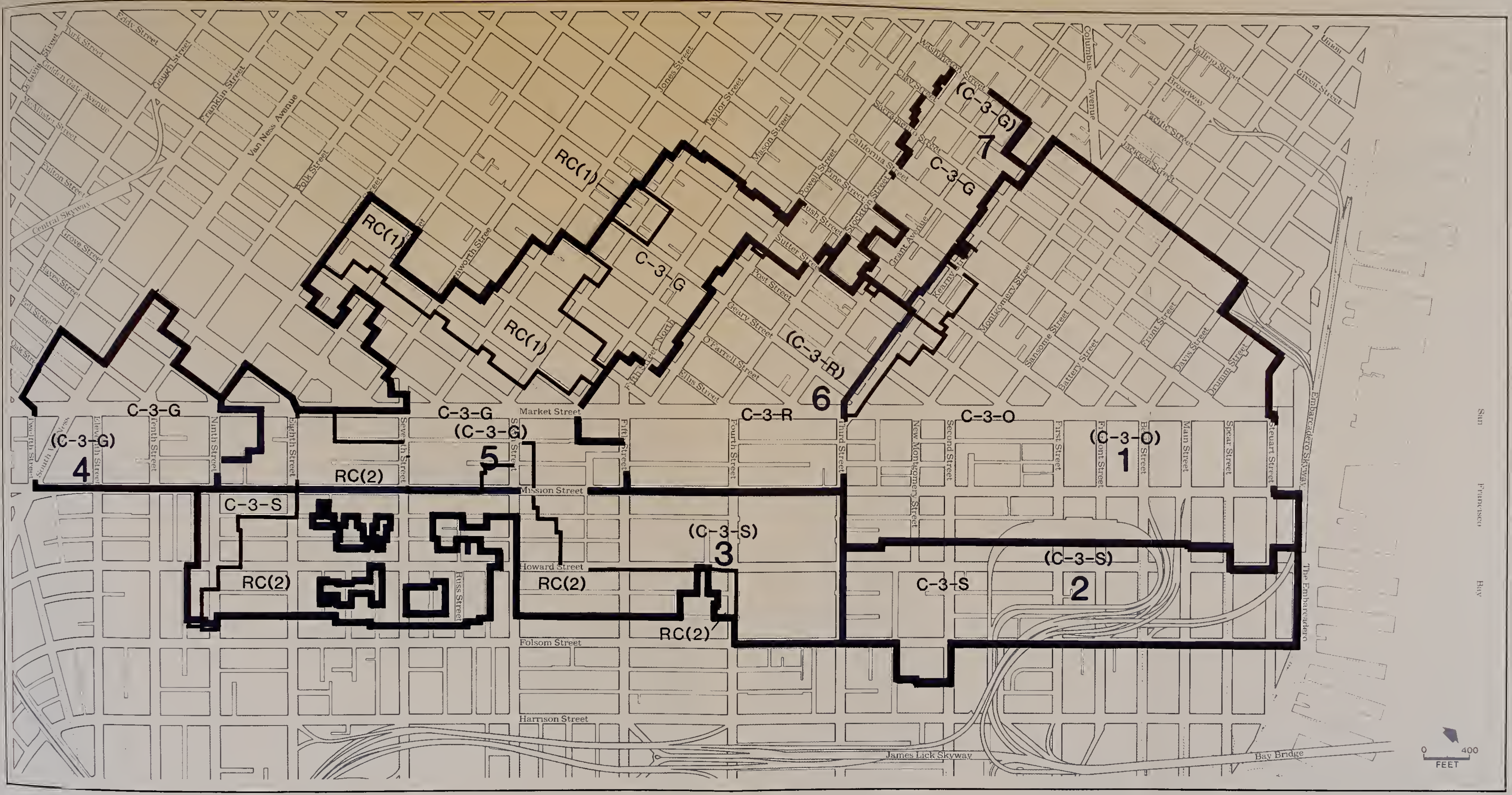
NOTES:

Study subareas and existing use districts are shown in blue.

See Table III.2 for explanation of use district symbols.

FIGURE VII.1:
ALTERNATIVE 4
USE DISTRICTS

SOURCE: Environmental Science Associates Inc.



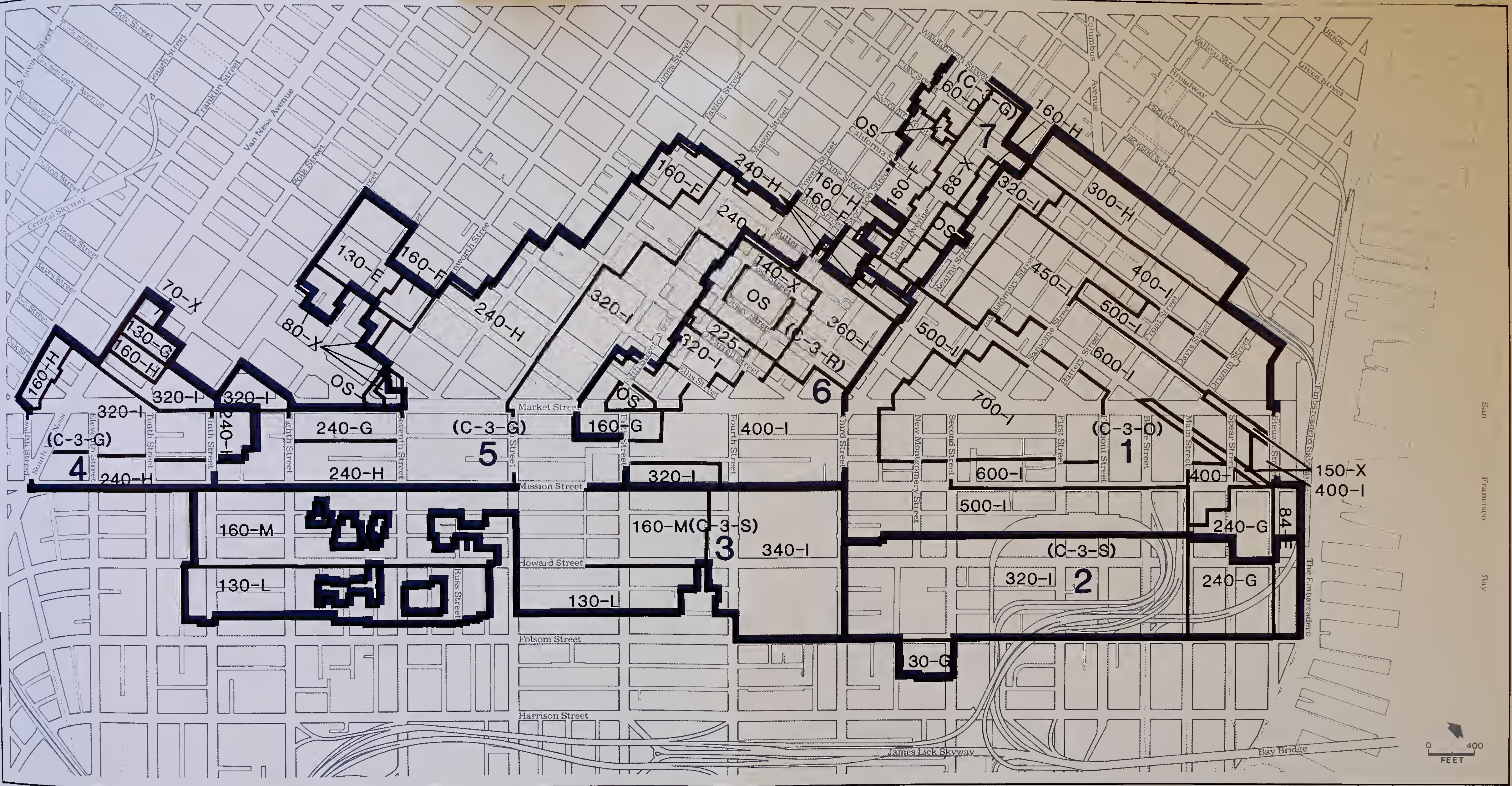
NOTES:

Study subareas and existing use districts are shown in blue.

See Table III.2 for explanation of use district symbols.

FIGURE VII.2:
ALTERNATIVE 5
USE DISTRICTS

SOURCE: San Francisco Department of City Planning and Environmental Science Associates, Inc.



BULK LIMITS: DISTRICT SYMBOL ON MAP	HEIGHT ABOVE WHICH MAXIMUM DIMENSIONS APPLY (in feet)	MAXIMUM PLAN DIMENSIONS (in feet) LENGTH	DIAGONAL DIMENSION
A	40	110	125
B	50	110	125
C	80	110	125
D	40	110	140
E	65	110	140
F	80	110	140
G	80	170	200
H	100	170	200
I	150	170	200
J	40	250	300
K	60	250	300
L	80	250	300
M	100	250	300

OS Open Space; see Planning Code Section 290.

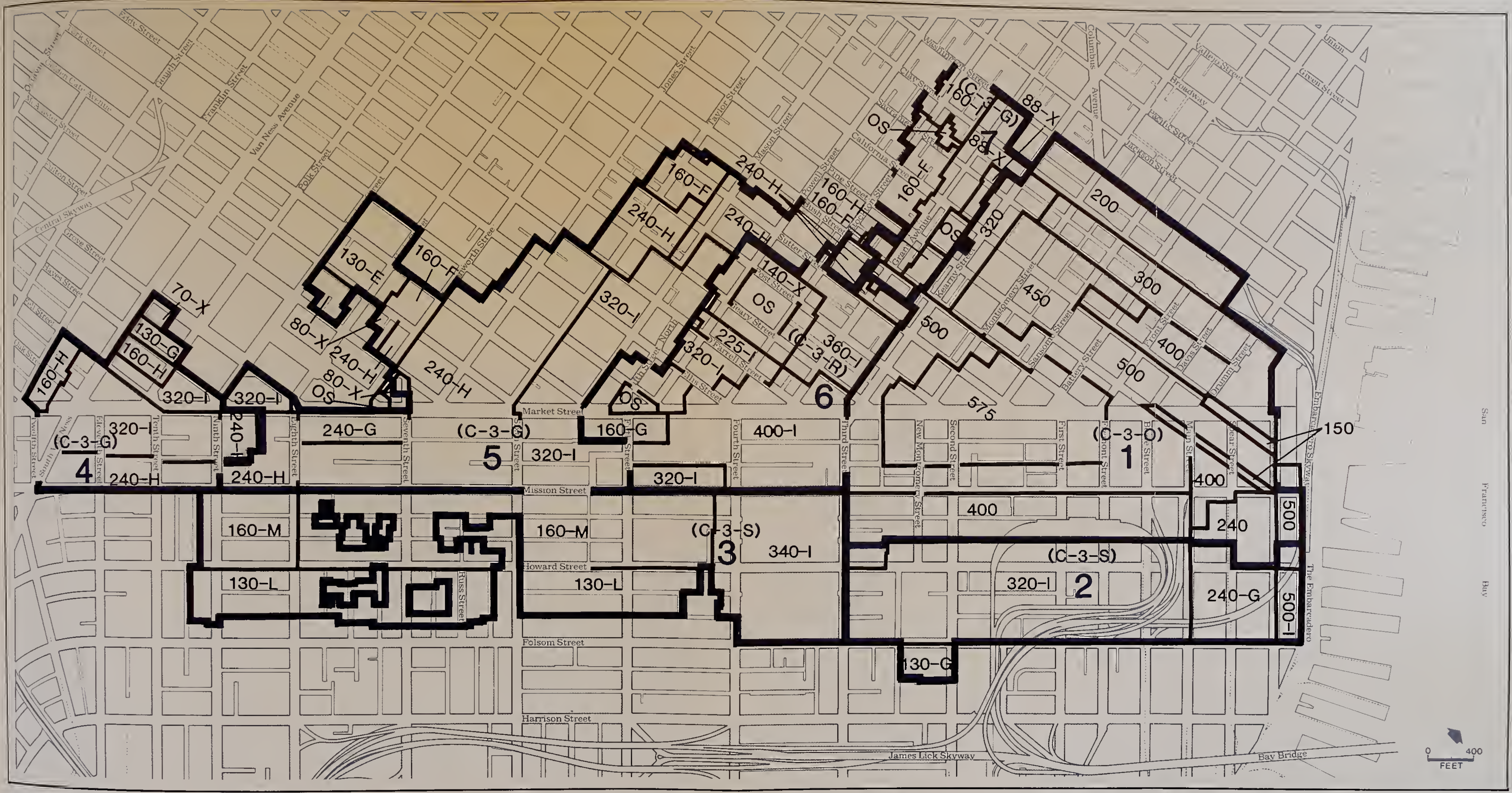
X This table not applicable. See Planning Code Section 260(a)3.

HEIGHT LIMITS: Shown on map in feet

NOTE: Study subareas and existing use districts are shown in blue.

FIGURE VII.3:
ALTERNATIVE 1
HEIGHT AND BULK DISTRICTS

SOURCE: San Francisco Planning Code and Environmental Science Associates, Inc.



BULK LIMITS IN C-3-S, C-3-R AND C-3-G DISTRICTS: *

DISTRICT SYMBOL ON MAP	HEIGHT ABOVE WHICH MAXIMUM DIMENSIONS APPLY (in feet)	MAXIMUM PLAN DIMENSIONS (in feet) LENGTH	DIAGONAL DIMENSION
A	40	110	125
B	50	110	125
C	80	110	125
D	40	110	140
E	65	110	140
F	80	110	140
G	80	170	200
H	100	170	200
I	150	170	200
J	40	250	300
K	60	250	300
L	80	250	300
M	100	250	300

HEIGHT LIMITS: Shown on map in feet

OS Open Space, see Planning Code Section 290.

X This table not applicable.
See Planning Code Section 260(a)3.

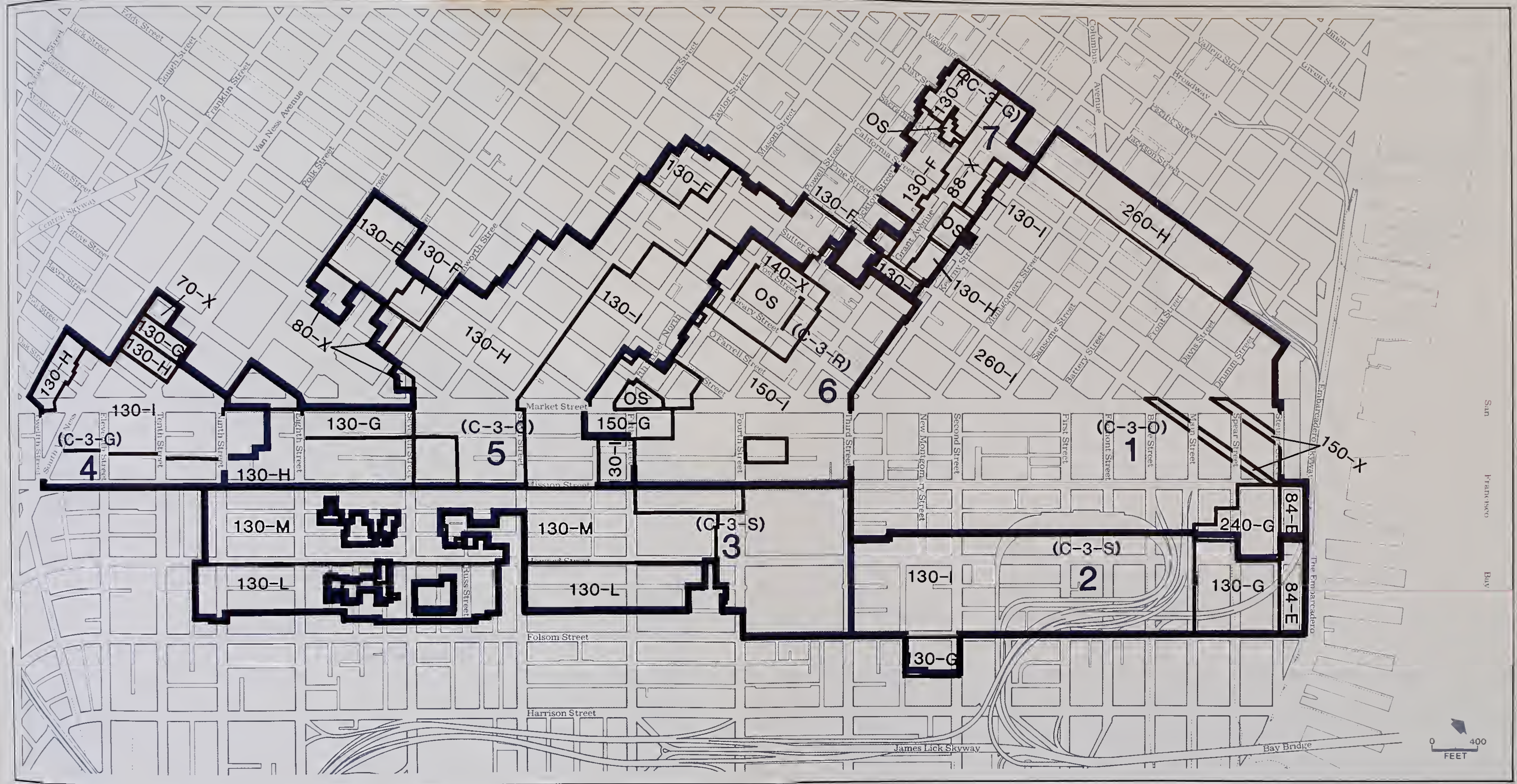
* In the C-3-O District, bulk limits are determined by side setbacks required above 150 ft. in height, as follows:

LOT WIDTH	MINIMUM SIDE SETBACK REQUIRED
If either lot dimension, length or width, is less than 75 feet	no side setback required
75-100 feet	one setback of 15 feet increasing in direct proportion to the width of the lot up to a maximum of 25 feet, but in no case should the building width be required to be less than 75 feet.
greater than 100 feet	one setback of 25 feet plus an additional foot for each 2.5 feet of lot width greater than 100 feet

NOTE: Study subareas and existing use districts are shown in blue.

FIGURE VII.4:
ALTERNATIVE 2
HEIGHT AND BULK DISTRICTS

SOURCE: San Francisco Planning Code and Environmental Science Associates, Inc.



BULK LIMITS: DISTRICT SYMBOL ON MAP	HEIGHT ABOVE WHICH MAXIMUM DIMENSIONS APPLY (in feet)	MAXIMUM PLAN DIMENSIONS (in feet)	
		LENGTH	DIAGONAL DIMENSION
A	40	110	125
B	50	110	125
C	80	110	125
D	40	110	140
E	65	110	140
F	80	110	140
G	80	170	200
H	100	170	200
I	150	170	200
J	40	250	300
K	60	250	300
L	80	250	300
M	100	250	300

OS Open Space; see Planning Code Section 290.

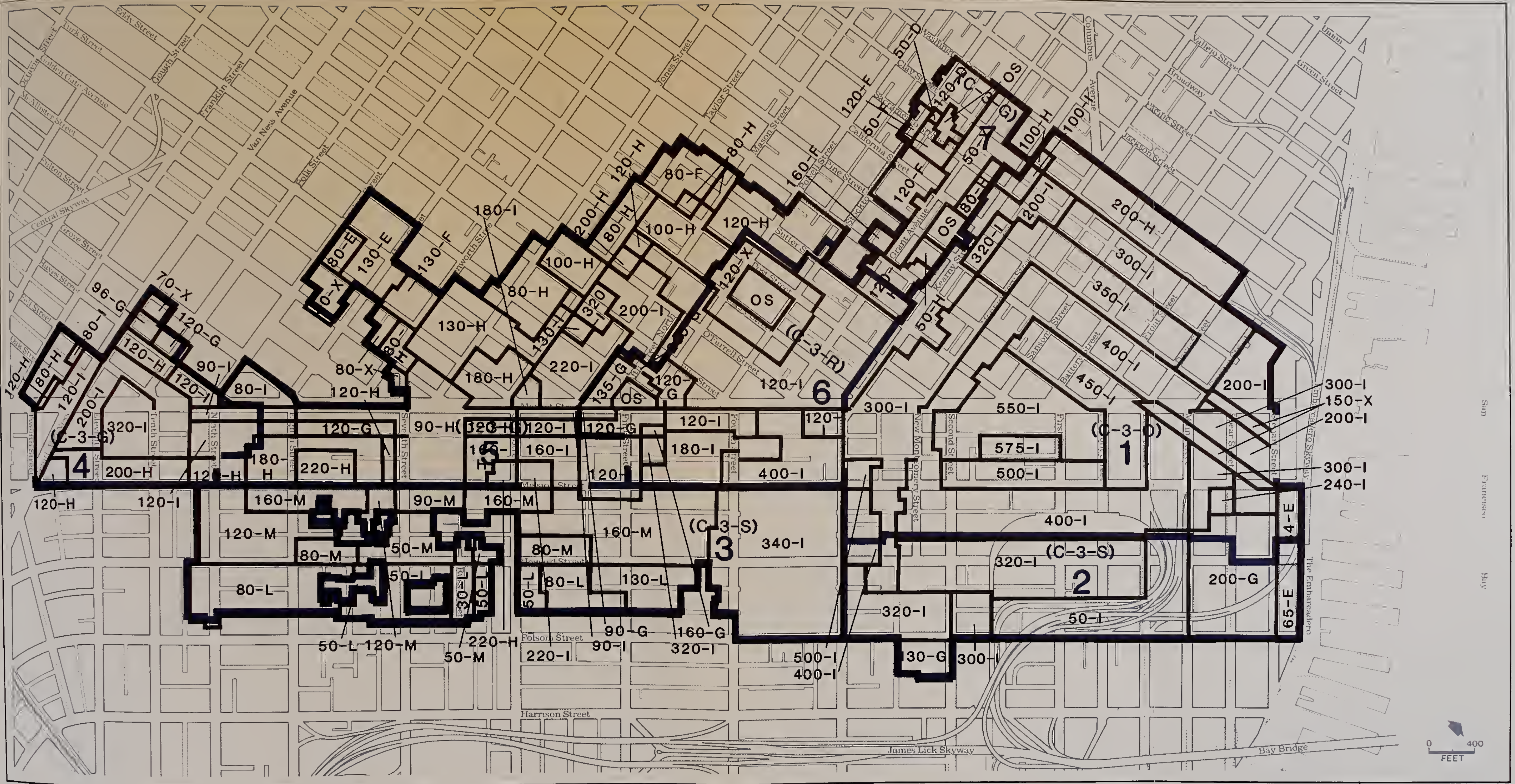
X This table not applicable. See Planning Code Section 260(a)3.

HEIGHT LIMITS: Shown on map in feet.

NOTE: Study subareas and existing use districts are shown in blue.

FIGURE VII.5:
ALTERNATIVE 3
HEIGHT AND BULK DISTRICTS

SOURCE: Environmental Science Associates, Inc.



BULK LIMITS: DISTRICT SYMBOL ON MAP	MAXIMUM PLAN DIMENSIONS (in feet)	
	LENGTH	DIAGONAL DIMENSION
A	110	125
B	110	125
C	110	125
D	110	140
E	110	140
F	110	140
G	170	200
H	170	200
I	170	200
J	250	300
K	250	300
L	250	300
M	250	300

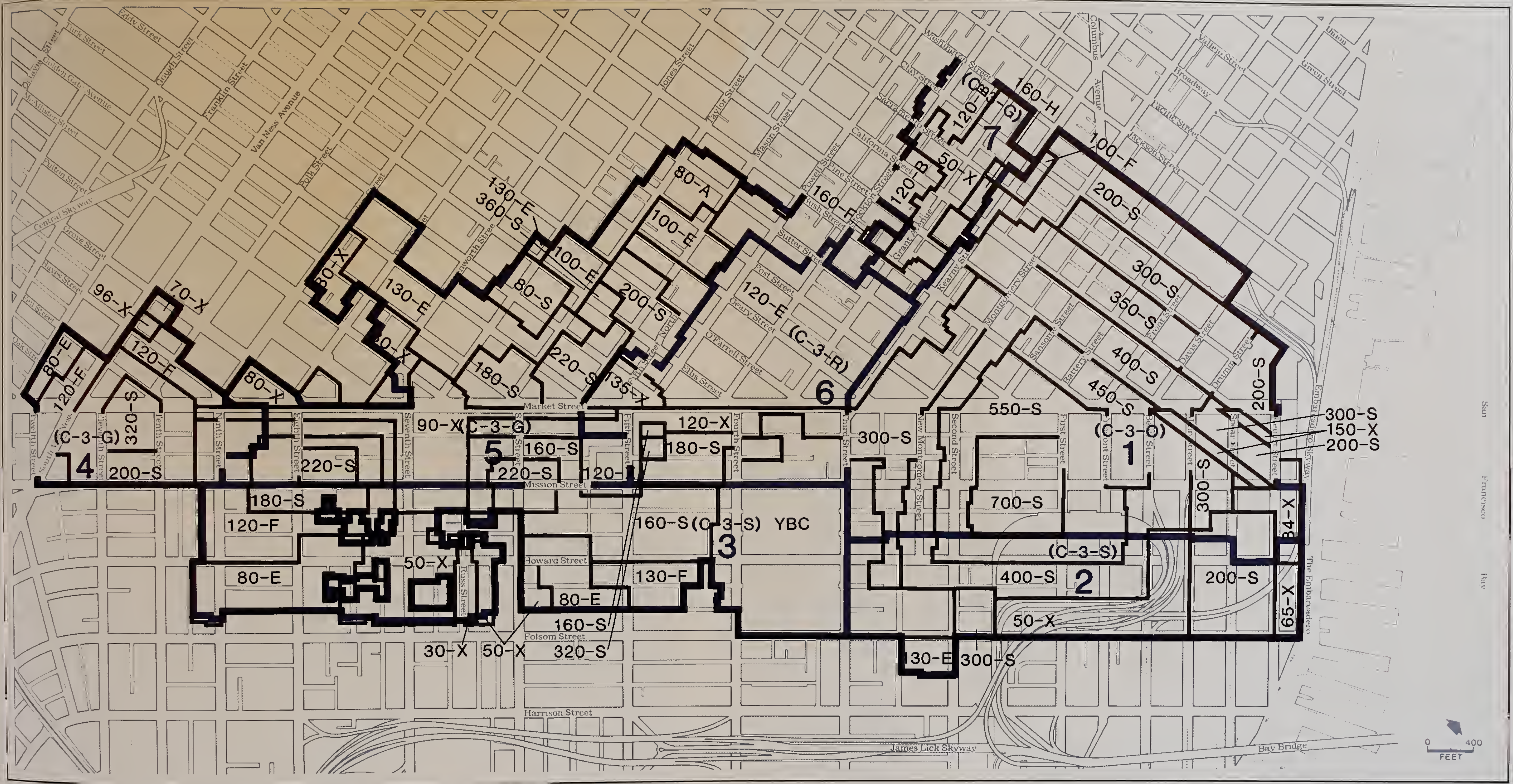
OS	Open Space; see Planning Code Section 290.
X	This table not applicable. See Planning Code Section 260(a)3.

HEIGHT LIMITS: Shown on map in feet.

NOTE: Study subareas and existing use districts are shown in blue.

FIGURE VII.6: ALTERNATIVE 4 HEIGHT AND BULK DISTRICTS

SOURCE: San Francisco Planning Code and Environmental Science Associates, Inc.



BULK LIMITS: DISTRICT SYMBOL ON MAP	HEIGHT ABOVE WHICH MAXIMUM DIMENSIONS APPLY (in feet)	MAXIMUM PLAN DIMENSIONS (in feet) LENGTH	MAXIMUM PLAN DIMENSIONS (in feet) DIAGONAL DIMENSION
A	40	110	125
B	50	110	125
C	80	110	125
D	40	110	140
E	65	110	140
F	80	110	140
J	40	250	300
K	60	250	300
L	80	250	300
M	100	250	300
S	See Guiding Downtown Development, page 5, for explanation of bulk limits in bulk district S.		

OS	Open Space; see Planning Code Section 290.
X	This table not applicable See Planning Code Section 260(a)3.

HEIGHT LIMITS: Shown on map in feet.

NOTE: Study subareas and existing use districts are shown in blue.

FIGURE VII.7:
ALTERNATIVE 5
HEIGHT AND BULK DISTRICTS

SOURCE: San Francisco Department of City Planning and Environmental Science Associates, Inc.

COMPARISON OF IMPACTS

A. LOCAL AND REGIONAL PLANS

A comparison of the Downtown Plan and the five Alternatives in the way that each responds to the objectives and policies of the San Francisco Master (Comprehensive) Plan, is shown in Table VII.3. As the policies are broad and general, the comparisons in Table VII.3 are also general. In some instances, one or more Alternatives are presented with precise standards, of which some are presented in Table VII.1, Appendix B, or the basic Alternative document.

Neither the Downtown Plan nor any of the Alternatives contain explicit provisions relating to noise or air quality. Provisions of the San Francisco Master Plan that relate to these topics are presented in this EIR in Sections IV.I and IV.J, but are not shown in Table VII.3. Neither does Table VII.3 does not contain any regional plan comparisons, as regional planning policies are more general than the San Francisco Master Plan policies as they apply to the comparison of Alternatives, and no additional comparative impressions could be gained.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (a)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1 (Planning Code)	ALTERNATIVE 2 (Growth Management Alternatives)	ALTERNATIVE 3 (Proposition "O")	ALTERNATIVE 4 (SFRG)	ALTERNATIVE 5 (Guiding Downtown Development)
Commerce and Industry:						
1. Objective 6, Policy 1 - Continued growth of prime downtown office activities so long as undesirable consequences of such growth can be avoided.	"Encourage prime downtown office activities to grow as long as undesirable consequences of such growth can be controlled."	No code requirements.	"As the scale and intensity of downtown development increases, there is a need for a growth management program which addresses the problems associated with growth."	Proposes limit on present "uncontrolled spread of high-rise buildings."	Proposes limit on annual development, reduction of C-3-O area, and reduced FAR and height.	Seeks to "maximize the advantages and minimize the disadvantages" of downtown growth.
2. Objective 6, Policy 2 - Guide locations to maintain a compact downtown core so as to minimize displacement of other viable uses.	"Guide location of office development to maintain a compact downtown core and minimize displacement of other uses." Also, would contract C-3-0 boundary to exclude portions of Chinatown, and would expand boundary South of Market, east of YBC.	In the C-3-O district, unrelated uses are excluded in order to conserve the supply of land in the core and its expansion area for further development of major office buildings.	Retains existing C-3-O district boundaries; reduces permitted FAR, height and bulk (see Table III. 2).	Retains existing C-3-O district boundaries; reduces permitted FAR, height, and bulk (see Table VII.1). Prohibits changing any C-3 district to another classification that would allow a more intensive use of the area.	Moves boundaries of C-3-O district inward on north and south, resulting in more compact district. Reduces permitted FAR and height (see Table III. 1).	Retains existing C-3-O district boundaries except on Kearny St. where the C-3-R (Retail) district is extended to the east side of the street.
3. Objective 6, Policy 3 - Assure that downtown development is compatible with the design and character of San Francisco.	"Assure that new buildings contribute to the visual unity of the city." Plan also contains design guidelines.	Permitted FAR and heights are the highest of any districts in the City. There are no code design requirements.	Recommends development of a mandatory design review procedure and guidelines.	As an objective, seeks to avoid a decline in the quality of life in San Francisco. Contains no recommendations.	Reduction of FAR and heights would result in buildings more in scale with the remainder of the City. Contains no recommendations.	Proposes recommendations considered appropriate "for creating buildings in scale and shape more suitable for San Francisco's environment."
4. Objective 6, Policy 4 - Provide adequate amenities for those who live, work, and use downtown.	See Nos. 7, 8, 12, 15, 16, 28, 31, 33 and 34.	"Certain desirable building features are encouraged by means of development bonuses."	Recommends limits on blank walls, widening of sidewalks, special design treatment to provide pedestrian scale and visual interest, street level retail space, and protection of views. Provides bonus of 10 sq. ft. of floor area per 1 sq. ft. of plaza area.	Permits bonuses for the "improvement of pedestrian environment," but does not describe or specify.	Provides a plaza bonus similar to that of Alternative 2. No recommendations on other amenities.	Recommendations are designed to provide "amenities that make downtown a special place".

(a) Table VII.3 presents the policies and implementing actions most relevant to the downtown for purposes of this comparison. Additional policies are identified in the Downtown Plan analysis presented in Section IV.A.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
5. Objective 6, Policy 5 - Control traffic and congestion in the downtown area, particularly from private automobiles.	"Organize and control traffic circulation to reduce congestion in the core caused by through traffic and channel vehicles into peripheral parking facilities."	No parking required; peripheral locations encouraged.	Recommends a transportation system management program (TSM).	Measures for "encouragement of public transit usage" may be adopted but are not specified.	No recommendation.	Implements a "transit-first downtown access policy." Suggests ways to "improve circulation in and around the downtown."
6. Objective 7, Policy 1 - Assure a strong interrelationship occurs between downtown specialty shopping, cultural entertainment, and visitor accommodation activities.	"Hotels and other visitor-oriented uses naturally tend to locate in geographical proximity to one another just as other sectors of the economy. Proximity to other hotels, restaurants, convention facilities, business appointments, sightseeing interests, other retail, and entertainment enhances visitor appeal."	C-3-R (Downtown Retail) and C-3-G (Downtown General Commercial) Districts are contiguous.	No recommendations.	No recommendations.	No recommendations.	No specific recommendations.
7. Objective 7, Policy 2 - Support the continued strength of high quality, specialty retail shopping facilities in the retail core.	"Maintain higher quality, specialty retail shopping facilities in the retail core."	C-3-R district is "a regional center for comparison shopper retailing, ... a compact area with a distinctive urban character".	No recommendations.	No recommendations.	No recommendations.	Supports "the continued strength of high quality, specialty retail shopping facilities in the downtown core; extends boundary of the C-3-R (Retail) district into the C-3-O (Office) district on Kearny Street and Belden Street.
8. Objective 7, Policy 3 - Encourage shopper accessibility to the downtown area and physical design amenities at a pedestrian scale which will enhance the pedestrian climate.	"Circulation within the area, and awareness of physical design amenities should be observed in promoting development of the downtown retail sector." (See also Nos. 15 and 28.)	"Continuity of retail and consumer uses is emphasized, with encouragement of pedestrian interest and amenities."	No recommendation re shopper accessibility. See No. 4 above re design amenities.	No recommendations re shopper accessibility. See No. 4 above re pedestrian amenities.	No recommendations.	Implement new Master Plan policies regarding pedestrian circulation, such as designating some streets for greater or exclusive pedestrian use, pedestrian networks providing midblock pedestrian ways, and preserving sunlight.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
9. Objective 10, Policy 1 - Guide the location of additional tourist related activites to minimize their adverse impacts on existing residential, commercial, and industrial activities.	"Guide the location of new hotels to minimize their adverse impacts on circulation, existing uses, and scale of development."	No specific code requirements.	No recommendations.	No recommendations.	No recommendations.	No recommendations.
Transportation:						
10. Mass Transit Objective 1 - Give first priority to improving transit service throughout the City, providing a convenient and efficient system as a feasible alternative to automobile use.	"Improve speed of transit travel and service by giving priority to transit vehicles where conflicts with auto traffic occur and by establishing a transit preferential street system."	Parking not required; discouraged in core, encouraged at periphery. C-3-O, C-3-R, and C-3-G districts shaped by proximity to transit service.	Encourage use of public transit. Investigate feasibility of downtown transportation improvement assessment district.	See No. 5 above.	Provides transportation bonus for special transportation facilities, i.e. public transportation systems, proportional to the additional development costs.	"A 'transit-first' downtown access policy should be vigorously implemented.... New development should contribute to expansion of the local and public transportation systems including supplemental transit shuttle services."
11. Mass Transit Objective 2 - Develop transit as the primary mode of travel to and from downtown and all major activity centers within the region.	"Develop transit as the primary method of travel to and from downtown."	See No. 10 above.	See No. 10 above.	See No. 5 above.	No recommendation.	See No. 10 above.
12. Downtown Objective 1 - Maintain the type and level of transportation facilities and services appropriate to enhance the economic vitality of the downtown business and shopping district.	"Provide the type and level of transportation services needed to maintain the economic vitality of the downtown business and shopping districts."	See No. 10 above.	Recommends cost-efficient programs for handling of downtown transportation problems including a Transportation Systems Management (TSM) program and a Transportation Improvement Assessment District.	No recommendations, but seeks to avoid increasing traffic congestion and parking problems.	No recommendations. States that existing transportation networks cannot accommodate the number of people projected to come into the City if the current rate of downtown construction continues.	New development should "contribute funds for maintaining and augmenting transportation service, in an amount proportional to the demand created".

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
13. Objective 1, Policy 2 - Provide needed additional short-term parking facilities in peripheral locations around but not within the downtown core, adjacent to major thoroughfares.	Includes the Master Plan policy.	See No. 10 above.	No recommendations.	No recommendations.	No recommendations.	"Require ... new short-term parking be immediately adjacent to, but not in, the core as defined in the Master Plan ... by creating special downtown parking districts."
14. Objective 1, Policy 3 - Discourage the addition of new long-term parking spaces in and around downtown ... and locate long-term parking facilities in areas peripheral to the downtown commercial district.	"Discourage new long-term parking spaces in and around downtown. "Locate any new long-term parking facilities in areas peripheral to downtown."	See No. 10 above. Conditional use required for parking which is not accessory to principal uses.	Long-term single occupant auto commute trips into downtown San Francisco should be discouraged. Employees should be encouraged to use car/vanpools by having priority parking space available.	No recommendations.	No recommendations.	"Require any needed new long-term parking to be located on the periphery of the downtown C-3 districts and linked to downtown by transit."
15. Downtown Objective 2 - Improve the downtown pedestrian circulation system, especially within the downtown core, to provide for the comfortable, safe and convenient movement of pedestrians.	"Improve the Downtown Pedestrian Circulation system, especially within the core, to provide for efficient, comfortable, and safe movement."	No specific code requirements.	Provide 20% bonus for improved pedestrian access; also provide 40 sq. ft. of floor area for each linear ft. by which walking distance between streets and alleys is shortened. Recommends sidewalk width standards.	No recommendations.	No recommendations.	See No. 8 above. Would implement a pedestrian street plan; provide sufficient pedestrian space by regulating the location of sidewalk structures; require mid-block pedestrian ways and arcades pursuant to a pedestrian network plan.
16. Objective 2, Policy 4 - Create a pedestrian network in the core area which include streets devoted to or primarily oriented to pedestrian use.	Includes the Master Plan policy. Also implements a pedestrian network.	No specific code requirements.	No recommendations.	No recommendations.	No recommendations.	See No. 15 above.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
17. Downtown Objective 4 - Improve facilities for freight deliveries and business services.	Includes the Master Plan policy and includes standards more stringent than the present code.	Number and size of required loading spaces less stringent than for the Downtown Plan and Alternative 5.	No recommendations.	No recommendations.	No recommendations.	"Improve facilities for off-street goods delivery in new development so as not to aggravate on-street conflicts between delivery vehicles and other traffic and pedestrian movements. Recommends standards more stringent than present code.
18. Objective 4, Policy 1 - Require off-street facilities for freight loading and service vehicles in all new developments sufficient to meet the demands generated by the intended uses.	Includes the Master Plan policy. See also No. 17 above. More spaces required than in Alternative 1.	See No. 17 above. Fewer spaces required, loading spaces less stringent than for the Downtown Plan and Alternative 5.	No recommendations.	No recommendations.	No recommendations.	See No. 17 above. More space required than in Alternative 1.
Residence (Housing) Element						
19. Objective 1, Policy 2 - "Facilitate the conversion of underused industrial and commercial areas to residential use."	Includes the same policy. Also recommends rezoning areas of Rincon Hill, Central South of Market, South Van Ness and Van Ness corridor for housing.	Conditional use required in most instances.	No recommendations.	No recommendations.	No recommendations.	Recommends rezoning areas for housing in the Central South-of-Market, Rincon Hill, South Park, South Van Ness, Van Ness Corridor and Mission Bay Areas. The first is in the C-3 study area; the others are adjacent or near the study area.
20. Objective 1, Policy 3 - Promote the inclusion of housing in downtown commercial developments.	Includes the same policy. Also allows housing in excess of base FAR in C-3-G and C-3-S districts.	No code requirements.	No recommendations.	Recommends bonus when when new housing is constructed on or within 500 feet of a new building (bonus equal to floor area of new housing).	Downtown height limits would be reduced below existing limits, but residential buildings or segments of buildings, could be exempted from the reduction.	Provides an FAR bonus for residential or mixed office-residential projects downtown. The additional FAR would be 5:1 in the C-3-O district, 3:1 in the C-3-R district, 4:1 in the C-3-G district, and 2:1 in the C-3-S district.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
21. Objective 3 - "To retain the existing supply of housing."	"Protect residential uses in and adjacent to downtown from encroachment by commercial uses." It would contract the C-3 district adjacent to the Tenderloin, portions of Chinatown and Nob Hill to protect housing.	No code requirements.	No recommendations.	No recommendations.	The C-3 district area would be reduced to exclude residential areas of the Tenderloin and South of Market.	The C-3-G district adjacent to the Tenderloin would be contracted to protect housing in the Tenderloin. (See also No. 22.)
22. Objective 3, Policy 2 - Restrict the conversion of housing in commercial and industrial areas.	"Restrict the demolition and conversion of housing in commercial areas."	No code requirements.	No recommendations.	No recommendations.	Protect and encourage residential uses adjacent to downtown. Prohibits conversion of residential buildings to office use.	"Protection of both residential hotels and apartment units should be provided either by some form of R/C zoning, a demolition and conversion control ordinance, or both."
23. Objective 3, Policy 3 - Preserve the existing stock of residential hotels.	"Preserve existing residential hotels." Would contract the C-3-G boundary in the Tenderloin to protect housing.	No code requirements.	No recommendations.	No recommendations.	Provides a bonus for transfer of development rights from residential hotels preserved in the same way as meritorious buildings. (See No. 31 below.)	A revision of the C-3-G boundary in the Tenderloin is recommended "to more sharply delinate the edge of commercial downtown and the predominantly residential part of the Tenderloin".
24. Objective 5, Policy 8 - Ensure that office developments ... assist in meeting the housing demand they generate.	No recommendations.	No code requirements.	Provides bonus.	No recommendations.	Office developers must provide for the substantial rehabilitation of existing housing units or for the construction of new housing units at the rate of 1 unit for every 4 employees in new office development. Affordability of new units must correspond to income levels of new office project occupants; or, developer must pay in-lieu fee (see Table VII.1).	"Development of new housing (or rehabilitation of long-vacant existing housing) should be required as a condition of approval of all projects containing more than 50,000 sq. ft. of office space at the rate of 640 sq. ft. of housing for every 1000 sq. ft. of office space, and 0.9 units per 1000 sq. ft. of office space. The housing could be provided as part of the office building or on another site.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
Urban Design						
25. Objective 3, Policy 1 - Promote harmony in the visual relationships and transitions between new and older buildings.	"Ensure that new facades relate harmoniously with nearby facade patterns." Also includes design standards.	No code requirements.	No recommendations.	No recommendations.	No recommendations.	Recommends design standards.
26. Objective 3, Policy 2 - Avoid extreme contrasts in color, shape and other characteristics which will cause new buildings to stand out in excess of their public importance.	"Assure that new buildings contribute to the visual unity of the City." (See also Nos. 25, 27, and 28.)	No code requirements.	No recommendations.	No recommendations.	No recommendations.	Specific standards established.
27. Objective 3, Policy 3 - Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.	"Foster sculpturing of building form, less overpowing buildings and more interesting tops." The Plan also contains specific design standards.	No code requirements.	Recommends mandatory design review and development of design guidelines.	No recommendations. (Recommended FAR and height limits would reduce prominence of buildings.)	No recommendations. (Recommended FAR and height limits would reduce prominence of buildings.)	Specific standards established.
28. Objective 3, Policy 4 - Promote building forms that will respect and improve the integrity of open spaces and other public areas.	"Promote building forms that will maximize the sun access to open spaces and other public areas." "Promote building forms that will minimize the creation of surface winds near the base of buildings."	No code requirements.	Recommends reduced bulk, side setbacks on upper floors, and sufficient space between towers "to protect views and ensure adequate sunlight and air". Bonuses provided for plaza areas.	Recommended FAR and height limits would have an effect on retaining existing qualities of open space.	No recommendation, except for bonus for plaza space as in Alternative 2.	Provides sunlight access requirements.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
29. Objective 3, Policy 5 - Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.	Includes the Master Plan policy. Also height limits are modified and reduced compared with Alternative 1.	Height districts established by code allow greater heights than other Alternatives.	Recommends reduced height limits in C-3-O district, ranging from 575 ft. to 240 ft.	Height limits would be no higher than 260 ft. in C-3-O district, 150 ft. in C-3-R, and 130 ft. in C-3-G and C-3-S districts.	Recommends height limits as low as any proposed by other Alternatives except Alternative 3.	Height limits are modified and reduced compared with Alternative 1.
30. Objective 3, Policy 6 - Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.	Bulk standards are modified and refined in proposed code amendments. (See also Nos. 26 and 27.)	Established by code in relation to height.	Recommends side setbacks in proportion to lot widths, and bonuses for further reductions in bulk.	Bulk same as Alternative 1.	Bulk measured as in Alternative 1 but; would apply at street level. Lower height limits affect precise effects.	Bulk standards modified and refined in proposed code amendments.
31. Objective 2, Policy 4 - Preserve notable landmarks ... and promote the preservation of other buildings and features that provide continuity with past development.	Includes the Master Plan policy. Also provides for transfer of development rights from significant buildings; restricts demolition of some significant buildings.	Contains provisions for designating landmark buildings and provides restrictions on demolition.	Permits an increase in floor area for the transfer of unused development rights from designated historic or architecturally significant buildings, and a bonus for preservation of "A" buildings.	Permits an FAR bonus of 50,000 to 100,000 sq. ft. for preservation in perpetuity of designated City landmark or building listed on the National Register of Historic Places if within 500 feet of new project in in C-3 district.	Provides a preservation bonus as in Alternative 3.	Provides for transfer of development rights from significant building sites; establishes new Conservation Districts with incentive regulations to preserve designated buildings.
Land Use						
32. Land in the working areas is classified into four categories: 1) Downtown, 2) Business and Services, 3) Light Industry, and 4) General Industry.	Contracts C-3 boundary to exclude portions of Chinatown, Nob Hill and the Tenderloin. Converts C-3-S to C-3-0 South of Market east of Fifth St. Contract C-3-R around Mason and Eddy, and South of Market; expands near Grant and Union Square. Establishes C-3-YBC district.	C-3-O Downtown (Office) District extends further south. C-3-S (Downtown Support) District extends further south. Residential classifications are interspersed among nonresidential classifications. Residential uses are encouraged by bonus system.	C-3-O and C-3-S district boundaries are same as Alternative 1. Housing bonus is provided in C-3 districts.	C-3-O and C-3-S district boundaries are same Alternative 1.	C-3-O and C-3-S district boundaries are approximately same as Alternative 1 except in the Tenderloin where RC (Residential-Commercial) uses would be accommodated.	C-3-O and C-3-S district boundaries are approximately same as Alternative 1 except for extension of RC (Residential-Commercial) uses in the Tenderloin and South-of-Market. Residential uses are encouraged by a bonus system.

TABLE VII.3: RELATIONSHIP BETWEEN OBJECTIVES AND POLICIES OF THE MASTER PLAN, THE DOWNTOWN PLAN, AND ALTERNATIVES 1 THROUGH 5 (Continued)

MASTER PLAN	DOWNTOWN PLAN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
Recreation and Open Space						
33. Citywide System, Policy 1 - "Preserve public open space."	"Comfort in the design of open space by minimizing wind and maximizing sunshine." (See also item 29 above.) "Keep open-space facilities available to the public."	No code requirements.	Design factors to be considered include sunlight and shadow, wind velocity, and plazas. No specific open space recommendations.	No recommendations.	No recommendations.	That new development not so congest existing downtown open space and recreation space that there will be inadequate places for quiet relaxation in the open air and sunshine or for more active recreational pursuits.
34. Citywide System, Policy, - "Acquire additional citywide open space for public use."	"Develop an open space system that gives every person living and working downtown access to a sizable sunlit open space within convenient walking distance." "Encourage the creation of new open space that becomes a part of an interconnected pedestrian network."	No code requirements.	No recommendations.	No recommendations.	No recommendations.	"Require provisions of recreation and open space in proportion to building size."
35. Commercial, Objective 3 - "Promote effective energy management practices to maintain the economic vitality of commerce and industry."	No recommendations.	No code requirements.	Provides floor area bonus of 5,000 sq. ft. for each 15% reduction in energy demand allowed under state energy conservation standards.	Provides floor area bonus for "energy conservation beyond that mandated by law."	Provides floor area bonus 5 times greater than that provided under Alternative 2.	No recommendations.
36. Transportation, Objective 4 - "Increase the energy efficiency of transportation and encourage land use patterns and methods of transportation which use less energy."	For the Downtown Plan and all Alternatives see items 10-12, 17 and 18, above.					

SOURCE: Environmental Science Associates, Inc. and San Francisco Department of City Planning

B. LAND USE AND REAL ESTATE DEVELOPMENT

Introduction

The real estate development forecasts for the Downtown Plan and all Alternatives reflect the strong demand for space in downtown San Francisco. The economic factors favoring future development potential in the City are described in the preceding overview. The different policies of the Plan and the Alternatives result in somewhat different total amounts of C-3 District development by the year 2000. The greatest differences among the Plan and the Alternatives are the location of new development and the timing of development. The comparison among different sets of policies highlights the importance of real estate market conditions and how these adjustments to changed policies occur.

Comparison of C-3 District Forecasts

The differences among the Plan and the Alternatives would become evident during the 1990 to 2000 period./1/ The development forecast to 1990 is the same for the Plan and each Alternative. Projects under construction in mid-1982 provide space for the C-3 District employment growth forecast to 1984. The additional space in projects approved as of August 25, 1983, planned for Yerba Buena Center, and proposed, but not yet approved, would only be occupied by forecast employment growth around 1990./2/

Office buildings are the major land use in the C-3 District; they are also the predominant type of new development that would occur under the Plan and Alternatives. Table VII.B.1 shows the total office building construction in each of the three periods: 1981-1984, 1984-1990, and 1990-2000. The 1981 to 1990 forecast is the same for the Plan and all Alternatives. Office building projects under construction and mostly occupied between 1981 and 1984 account for a rapid pace of new development in the C-3 District, about 2.5 million sq. ft. per year./3/ The annual rate of construction would slow to about 1.6 million sq. ft. per year between 1984 and 1990.

TABLE VII.B.1: C-3 DISTRICT OFFICE BUILDING CONSTRUCTION FORECAST FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1981-2000 (Thousands of Gross Sq. Ft.)

	1981-1984	1984-1990	1990-2000					
				Alternative				
			Downtown Plan	1	2	3	4	5
Total Space in New Office Buildings	7,418	9,870	8,400	16,935	15,500	13,200	8,100	7,400
Annual Average Construction	2,473	1,645	840	1,694	1,550	1,320	810	740

NOTE: "Space in office buildings" includes space for office, retail, and branch bank uses. It is not the same as "space in office use", which appears in all the other tables in this section. "Space in office use" accounts for office space occupied by other uses (such as those noted above), as well as demolition and conversion.

SOURCE: Recht Hausrath & Associates.

After 1990, the different policies of the Plan and the Alternatives would affect office development more than other new commercial development. The annual rate of new office construction varies considerably among the Plan and the Alternatives./4/ Only under Alternative 1 (No Project) would the 1984-1990 rate of new development continue. All other policies would result in a slowing of the rate of new office development in the C-3 District, due to lower rates of employment growth. The Plan, at an annual rate of 0.8 million sq. ft. per year, would be closest to Alternatives 4 and 5, and about one-half of the rate forecast for the Alternative with the most new office construction (Alternative 1)./5/

The most difference among the Plan and Alternatives is evident in this comparison of new office building development forecasts. Other real estate market adjustments, such as increased employment densities in existing and new office space and higher rates of conversion, offset some of the lower amount of new development, so that the differences in other aspects of the scenarios (net change in space, employment growth) are not as large as the differences in new office construction.

Table VII.B.2 shows the total space forecasts by use and the percentage change from 1984 to 1990 and 1990 to 2000. This table indicates the relatively small differences among the Plan and Alternatives in terms of total development. The range of difference in total office space in the C-3 District by the year 2000 is only about 10 percent. There would be about 86.5 million sq. ft. of office space in the C-3 District under the highest growth Alternative (Alternative 1, No Project) and about 77.5 million sq. ft. of office space under the lowest growth Alternative (Alternative 4). The Downtown Plan forecast of 78.9 million sq. ft. of office space falls nearer the low end of the range. The 1990-2000 percentage change in C-3 District office space would range from 23 percent in Alternative 1 (No Project) to 10 percent in Alternative 4. There would be a 12 percent increase under the Downtown Plan.

The differences in amounts of other commercial space would not be as great as the differences for office space. Retail and hotel space would increase in the C-3 District under the Plan and all Alternatives. Total retail space would range from a high of 10.3 million sq. ft. under the No Project Alternative,

TABLE VII.B.2: C-3 DISTRICT SPACE BY USE FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5 (Thousands of Gross Sq. Ft.)

	1984	1990		2000											
				Total Space						% Change from 1990					
					Alternative						Alternative				
Use	Total Space	Total Space	% Change From 1984	Downtown Plan	1	2	3	4	5	Downtown Plan	1	2	3	4	5
Office	62,074	70,492	14	78,889	86,490	85,266	83,425	77,522	77,919	12	23	21	18	10	11
Retail	8,220	8,949	9	9,632	10,288	10,192	9,945	9,766	9,773	8	15	14	11	9	9
Transient Hotel	9,722	12,535	29	14,120	14,873	14,873	14,873	14,595	14,595	13	19	19	19	16	16
Residential Hotel	2,848	2,835	-1	2,835	2,835	2,835	2,835	2,835	2,835	--	--	--	--	--	--
Housing	4,178	5,273	26	5,843	5,603	7,253	6,118	8,218	6,173	11	6	38	16	56	17
Cultural/Institutional/ Educational/Other	6,120	5,998	-2	5,489	5,439	5,205	5,006	5,537	5,331	-8	-9	-13	-17	-8	-11
Industrial/Warehouse/ Automotive	4,128	3,285	-20	2,388	1,742	2,028	1,738	3,072	2,262	-27	-47	-38	-47	-6	-31
Parking	6,258	6,423	3	6,047	5,819	5,823	5,834	6,112	5,974	-6	-9	-9	-9	-5	-7
TOTAL	103,548	115,790	12	124,665	133,089	133,475	129,774	127,657	124,862	8	15	15	12	10	8

SOURCE: Recht Hausrath & Associates

Alternative 1, to a low of 9.6 million sq. ft. under the Downtown Plan. C-3 District policies would have more effect on the expansion of retail space than on the growth of retail sales. The primary reason is that more sales would occur in existing retail space if a smaller amount of new space is built. The differences among the Plan and the Alternatives in the amount of retail space added primarily reflect differences in retail space in new office buildings. Between 1990 and 2000, under the Plan and all Alternatives, development of transient hotel space would increase at a slower pace than in the prior decade. There would be little difference in the amount of hotel space built. The Downtown Plan contains the only policies that would directly regulate the size and location of major new hotel development in the C-3 District. Although it is not evident in this table showing total development, the Downtown Plan would result in a different distribution of new hotel development than would occur in any of the Alternatives. There would be less new development in the traditional hotel areas (Subareas 5 and 6) and some hotel development is forecast for Subarea 2.

During the 1990-2000 period, the amount of space devoted to cultural/institutional/educational/other, industrial/warehouse/automotive and parking uses is projected to decline in the C-3 District under all land use policies. This would occur largely because of increased competition for space, primarily from office activities. The decline in space in these uses would be the result of both demolition to make way for new construction, and conversion from one use to another. The Plan and the Alternatives would have different effects on both the amount of change that would occur and on the cause (demolition or conversion) of the decrease in space.

The net changes in commercial space by use reflected in the totals shown in Table VII.B.2 account for new construction, demolition, and conversion. The latter could be an important alternative source of space for businesses seeking lower-cost C-3 District offices. Its importance depends on the effects of C-3 District policy on the availability of space suitable for conversion, the costs of conversions and the amount of office space supplied through new construction. Conversions would be most important in Alternative 5, contributing about 17 percent of the net additional office space between 1990 and 2000. Although the amount of office space supplied in Alternative 4 would be less than that provided in Alternative 5, conversions would represent the smallest share of the total (three percent), compared to any of the other sets of policies. This is in part because Alternative 4 policies restrict conversions to office space, but mostly because the cost of fulfilling the housing requirement in this Alternative would apply to conversions as well as to new construction. Under the Plan, conversions would represent about 13 percent of the net additional office space supply, close to the shares in Alternative 1 (11 percent), Alternative 2 (12 percent), and Alternative 3 (14 percent). Although a smaller amount of new office space would be supplied under the Plan than under these three Alternatives (implying more demand for an alternate, lower-cost source of office space), the larger amount of new development that would occur in Subarea 2 under the Plan would result in more demolition of the space suitable for conversion in this subarea./6/

In addition to new construction and conversion, C-3 District policies would affect another development process that occurs as real estate market conditions change: upgrading existing space. This type of investment in existing space was considered in the space and employment forecasts. It is evident as employment growth beyond what would be accommodated in new or converted space.

Upgrading existing space does not result in net additions of space or in changes in use. Upgrading could result in changes in the types of tenants, types of merchandising, the physical appearance of the space, rents, and the number of workers employed in a given amount of space. This process is particularly applicable to office, retail and hotel space.

The most investment in existing space would occur under policies that constrain the supply of new space relative to demand. The market pressure thus created would result in more intensive use of existing space. Following this rationale, upgrading existing space would be most extensive in the Plan and Alternatives 4 and 5. Alternative 3 would have a moderate amount of upgrading. Alternatives 1 and 2 would have the least amount of this kind of real estate investment.

Residential development in the C-3 District would vary among the Plan and Alternatives due to differences in housing requirements and incentives to produce housing. From 1990 to 2000, the forecasts for additions to the C-3 District housing stock range from a low of 300 units (Alternative 1, No Project) to a high of 3,500 units (Alternative 4). The 600 units forecast to be added under the Plan are near the low end of the range. In all cases, the forecasts are not necessarily units that otherwise would not have been constructed. The net addition of units is considered in the discussion of residence patterns and housing, Section VII.D.

Locations of housing development, as well as unit sizes and prices, vary considerably depending on specific housing policies. The No Project Alternative, Alternative 1, includes neither housing incentives nor housing requirements. The Plan is closest to Alternative 1, in that the only incentive is that housing would be allowed above the base FAR in the C-3-G and C-3-S use districts (most of Subareas 3, 4 and 5). Because the City has a separate, on-going program for housing production (the Office-Housing Production Program) which is on a legislative track different from the Downtown Plan, the mitigation section of this EIR includes discussion of this program with respect to the Plan (see Section V.D)./7/ All of the other Alternatives would provide office space bonuses for housing production. This incentive allows additional office space to subsidize the cost of producing housing. Alternatives 4 and 5 include the only requirements that housing be produced as a condition of C-3 District office development. The requirements would result in housing construction and rehabilitation both in and out of the C-3 District. Additional comparison of citywide housing production under the Plan and Alternatives is in Section VII.D.

The Plan and all Alternatives include transferable development rights (TDR) systems as incentives for the retention of architectural resources. The Plan also includes a prohibition on the demolition of designated "significant" buildings. Generally, the combination of the prohibition and the TDR incentive in the Plan would be most effective in ensuring that buildings would be retained. Alternatives 2 and 5 would be the next most effective, and the policies of Alternatives 1 and 3 would be the weakest.

To a greater degree than the other Alternatives (with the exception of Alternative 5), the TDR system of the Downtown Plan is part of a strategy to redirect downtown development. Alternative 5 includes elements of the same strategy, though analysis indicates that the Alternative 5 policies would not be as effective as the Plan policies.

Table VII.B.3 shows the Plan and Alternatives forecast distributions of C-3 District space by subarea and the percentage change in each subarea. Subarea 1 would have the most total space in 2000 under the Plan and all Alternatives, ranging from a low of 59.7 million sq. ft. under the Plan to a high of 64.6 million sq. ft. under Alternative 1 (No Project). Total space in Subarea 2 would be greater under the Plan (9.8 million sq. ft. in 2000) than in any of the Alternatives, and the percentage change between 1990 and 2000 would also be greater (34 percent). This is the only instance in which Alternatives 1 or 2 (the highest growth Alternatives, overall) would not result in the greatest relative change between 1990 and 2000.

In general, the overall effects of the Plan and the Alternatives would be more similar in the other subareas. The Plan and Alternatives 4 and 5 would result in smaller amounts of development in Subareas 3, 4, 5, and 6 than would Alternatives 1, 2 and 3. Because of the strategy to redirect the trend of financial district expansion away from the Union Square area, the Plan would have the smallest percentage change in space in Subarea 6. Because it was assumed that no major new construction would occur in Subarea 7 (Chinatown), the Plan forecast shows the smallest amount of change in that subarea also.

Comparison Of Citywide Effects On Land Use And Real Estate Development

An important point of comparison among the Plan and the Alternatives is their effect on development outside the C-3 District. Under any set of policies for the C-3 District, the amount and type of real estate development activity that occurred in other City areas would depend on land use and zoning policies in those areas. Analysis of the Downtown Plan and other C-3 District Alternatives indicates the extent to which the C-3 District policies could influence real estate market conditions, particularly in adjacent areas such as Chinatown, and south of the C-3 District.

TABLE VII.B.3: C-3 DISTRICT SPACE BY SUBAREA FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5 (Thousands of Gross Sq. Ft.)

	1984	1990		2000											
				Total Space						% Change from 1990					
					Alternative						Alternative				
Subarea	Total Space	Total Space	% Change From 1984	Downtown Plan	1	2	3	4	5	Downtown Plan	1	2	3	4	5
1	49,222	55,496	13	59,694	64,582	64,014	62,321	61,786	60,197	8	16	15	12	11	8
2	6,385	7,275	14	9,766	9,576	9,572	8,847	8,102	8,317	34	32	32	22	11	14
3	7,749	8,271	7	8,756	9,331	9,723	9,306	9,245	8,663	6	13	18	13	12	5
4	6,009	6,009	--	6,324	6,459	6,589	6,630	6,419	6,189	5	7	10	10	7	3
5	17,816	19,640	10	20,868	21,868	22,219	21,855	21,432	21,195	6	11	13	11	9	8
6	12,486	15,007	20	15,693	16,710	16,666	16,408	16,141	15,919	5	11	11	9	8	6
7	3,881	4,092	5	4,142	4,563	4,692	4,407	4,532	4,382	1	12	15	8	11	7
TOTAL	103,548	115,790	12	125,243	133,089	133,475	129,774	127,657	124,862	8	15	15	12	10	8

SOURCE: Recht Hausrath & Associates

As downtown growth occurs (as it would under the Plan and all Alternatives) there would be pressures to expand the area of downtown economic activity (both office and office support activity) beyond the bounds of the C-3 District. The existence of these pressures has led to the proposed removal of Chinatown from the C-3 District (considered in the Downtown Plan) and the recent enactment of interim controls for the South of Market Industrial Conservation Special Use District.

Assuming City policies allowed and encouraged shifts of downtown activities to some areas outside the C-3 District, the Downtown Plan and Alternative 5 would speed up the timing of this shift and would increase the overall amount of activity involved./8/ This is because the demand for lower-rent office space would be particularly strong under these C-3 District policies and the areas outside the C-3 District, particularly to the south of Folsom Street, offer the most opportunities for accommodating this type of use. The suitability of these City locations for this type of downtown expansion implies that the differences among the Plan and Alternatives, in terms of total development and employment, would not be as great as indicated in the EIR tables (limited to C-3 District effects), if a larger area of the City were considered. A substantial amount of the downtown development expected under the higher C-3 District growth alternatives (Alternatives 1, 2, and 3) could be accommodated south of the C-3 District under the Plan and Alternative 5. This does not mean that no development pressures would occur in these areas under Alternatives 1, 2 and 3. The timing of these shifts would be slower, however.

Among the Plan and Alternatives, assuming similar City policies in areas outside the C-3 District, Alternative 4 would be the only C-3 District plan that would not result in eventual substantial amounts of development in areas outside the C-3 District. This is because the housing requirement incorporated in Alternative 4 (requiring that housing be provided at prices affordable by all workers in the office space) would apply citywide, and not only to new office construction, but also to conversions./9/ This additional development cost would be most effective in limiting real estate activity in the peripheral downtown areas.

Comparison of Effects on Property Values

The real estate impacts of the Downtown Plan and the Alternatives can be compared from the perspective of C-3 District property owners. The owners of potential development sites have certain expectations for the land value of their property based on policies regarding appropriate land use, the size of new buildings, and development costs, as well as the demand for space (rents). The owners of existing buildings also have expectations regarding rents and the potential for upgrading, conversion, or demolition and new development. Depending on the location of the property, the type and amount of existing building space, and the historic preservation status of the existing building, a change in policies could result in changes in property values.

Increases in the costs of development would reduce land value from what it otherwise would have been at similar rents. Additional controls on the location and size of new buildings could reduce the income earning potential of new projects and thus reduce land value from what it otherwise would have been. To the extent that less additional space is developed, these same factors would also eventually result in an increase in rents, due to the interaction of the demand for space and the amount, type and location of space provided. As rents increase, so would the land value of a development site, as well as the rental value of existing building space. Whether the increase in value from higher rents compensates for the decrease in value because of reduced development potential would depend on the characteristics of the site. Relatively restrictive development controls on specific sites or areas of the C-3 District would tend to reduce land values for these sites or areas (and raise the value of existing building space there), but could also result in increased land values elsewhere.

The owners of development sites in the present C-3 District core area (Subareas 1, 6 and 7) would be allowed the greatest amount of development on their property in Alternative 1 (No Project) and Alternative 2, compared to the Plan and the other Alternatives. Their land values would be less in Alternative 3 because of restrictions on the size of new buildings. Alternaives 4 and 5 and the Plan would be relatively more restrictive in these areas. Alternative 5 and the Plan would have a greater effect on land values in specific locations in Subareas 1, 6, and 7 where the size of new development and the number of development sites would be most constrained relative to Alternatives 1 and 2. The sites on which a large amount of development is allowed (south of Market Street in Subarea 1) would have higher land values under Alternative 5 and the Plan because of the increasing scarcity of such sites under these types of policies.

The owners of development sites bordering the present core area (Subareas 2 and 5) would find their land values highest in Alternatives 1 and 2, compared to the other C-3 District policies. The land value of these sites would be fairly high in Alternative 3 due to the sprawling pattern of new development under this Alternative. Under Alternative 4, the development potential on many of these sites (and hence land value) would be less than under Alternatives 1 and 2, due to zoning changes and the relatively high costs of satisfying the housing requirement. Under Alternative 5 and the Plan, many landowners in Subarea 2 would be relatively better off because of the prospects for development offered by demand that would not be accommodated in the existing core area; other landowners (in Subarea 5) would have lower land values than in the higher growth Alternatives because the uses of their property would be restricted due to rezoning.

Comparison of the C-3 District forecasts indicates that land values for owners of development sites on the periphery of the C-3 District (Subareas 3 and 4) would be highest in Alternative 3, moderately high in Alternatives 1 and 2, and lowest in Alternative 4. These landowners would be somewhat better off under Alternative 5 and the Plan, because they would not have to satisfy the more costly housing requirement of Alternative 4.

Values of existing buildings would increase the most under the policies that place the most restrictions on new construction (Alternatives 4, 5, the Plan and, to a lesser extent, Alternative 3). On sites with existing buildings with low floor area ratios the financial return from new development is likely to be larger than the value of the existing building, making demolition and new development likely. Thus, the owners of these buildings would have development sites. The implications of the Plan and the Alternatives for property values for such sites are discussed above. The exception would be owners of designated historic buildings, especially those rated in category I or category II under the Downtown Plan. The effectiveness of the TDR system, discussed below, would determine the effects on property values for this group. The owners of large existing buildings would find the values of these buildings increasing at a faster pace in the Plan and Alternatives 4 and 5 than under Alternatives 1 and 2. Their values under Alternative 3 would fall in the middle of this range. These property owners would be able to take advantage of the scarcity of new space and of the continued strong demand for space particularly in prime C-3 District locations to raise rents for their existing space.

For owners of sites with designated historic buildings, the value of their property would depend on the TDR systems of the Plan and Alternatives, as well as on the factors that would affect all other C-3 District sites. Only under the Downtown Plan would retention of some designated buildings be required. By selling TDRs, most of these property owners would eventually receive a financial return for forgoing the opportunity to demolish their building for new development. Some of these property owners may not sell TDRs but would find the value of their property increasing due to the enhancement of the character of the area as a result of the protective policies of the Plan. Some owners of designated buildings in the outlying subareas (Subareas 3, 4, and 5) might receive a higher return from their property in the short term under the Downtown Plan compared to the Alternatives, due to the ability to sell development rights to developers in the Special Development District. Under the Alternatives, most of these properties would only become development sites over a longer time period.

In the other Alternatives, the TDR system would be less important as a means of providing property value, because designated buildings could be demolished for new development. In fact, to work as incentives for retaining buildings, selling TDRs would have to result in property values being equal to or higher than they otherwise would have been under the policies of the C-3 District Alternatives.

Longer Term Perspective

Beyond the year 2000, it is likely that the differences in C-3 District development among the Downtown Plan and Alternatives would become smaller over time. There are several reasons for these changes.

Over time, development could become more feasible in locations to which C-3 District policies are designed to redirect growth. This would occur as development gradually shifts to more outlying locations thereby enhancing the acceptability of such locations and raising obtainable rents. For example, after 2000, there is likely to be proportionally more office development in Subarea 2 under the Plan and Alternative 5 as compared to Alternative 1 (No Project) than is forecast from 1990 to 2000. Generally, the forecasts for 1990 to 2000 for the lower growth C-3 District policies include a period of real estate market adjustment. Beyond 2000, growth rates in certain areas could accelerate under these policies.

Secondly, the rate of C-3 District development in the higher growth Alternatives (Alternatives 1, 2 and 3) would slow over time, as portions of the C-3 District would become fully developed. There would consequently be less future difference in development between these and the lower growth scenarios. For example, if Alternative 1 (No Project) is compared to the Downtown Plan, the lower amount of office development in Subarea 1 from 1990 to 2000 under the Plan can be partly explained by policies requiring the retention of significant buildings. Once those sites were developed under Alternative 1, there would be fewer future differences between the two sets of policies, since these sites would not provide development opportunities in either case.

A third consideration regarding the long term perspective concerns the future quality of the environment in the C-3 District. If the policies of the Plan or an Alternative were successful in preserving or enhancing the C-3 District's environment relative to the quality of the environment under another set of policies, then the differences in development between these policies could change over time. In other words, there could be less difference in long term economic growth to the extent that more limited growth in the short term resulted in an enhanced environment over the long term that would retain or attract economic activity to the C-3 District.

After 2000, the combined effects of these factors are likely to narrow the differences in the amount of development and economic activity among the Plan and Alternatives. The most change is likely to occur in the relative position of the Plan and Alternative 5. They are likely to become more similar to Alternatives 1, 2, and 3 and less similar to Alternative 4 over time. Alternatives 1, 2, and 3 are likely to become more similar to each other.

NOTES - Land Use and Real Estate Development

/1/ See "Growth Management Alternatives for Downtown San Francisco: The Downtown EIR Consultant's Report", Environmental Science Associates, Inc., May 1983 (hereinafter Consultant's Report), for a detailed discussion of the effects of Alternatives 1 through 5 on C-3 District land use and development patterns. In particular, see Section V.B, Land Use and Real Estate Development Impacts. Section V.B is hereby incorporated by reference into this EIR and summarized in the text of this section (VII.B).

/2/ Section IV.B, Land Use and Real Estate Development Impact (in this EIR), describes the assumptions about C-3 District development to 1990 in more detail. To summarize, about 13.5 million sq. ft. of space would be provided in Yerba Buena Center (YBC) and in projects approved as of August 25, 1983. Some additional office space would also be provided in conversions from other uses. The additional 2.3 million sq. ft. of space in office buildings that could be absorbed according to the 1990 employment forecast is assumed to be provided in projects to be approved after August 25, 1983.

In the analysis of Alternatives 1 through 5 in the Consultant's Report, the potential development in the 1984 to 1990 period was referred to as "the pipeline". It included all space in projects approved or under formal review as of mid-1982, as well as those planned for YBC. Some of the projects under review in mid-1982 were approved by August 25, 1983; others had been withdrawn or were still in the review process. Two new projects in the C-3 District were proposed for the City's review in the interim period. All of these projects are in Subarea 1. In the Consultant's Report, it was assumed that pipeline projects were likely to be developed and occupied before projects that had not yet been proposed. The employment forecasts indicated that almost all of the space in pipeline projects would be absorbed by 1990.

3/ Not all of the space in office buildings under construction in mid-1982 would be absorbed by the demand for space due to estimated office employment growth to 1984. This amount of space is added to the office space developed between 1984 and 1990, and would become occupied during that period.

NOTES - Land Use and Real Estate Development (Continued)

/4/ The 1990 to 2000 estimates in Table VII.B.1 reflect new construction that would be built and absorbed by demand due to forecasts of employment growth through the year 2000. They do not reflect projects that would be under construction by 2000, to be occupied at some later date.

/5/ The next section, VII.C, compares the business and employment impacts of the Plan and Alternatives. It notes that one of the major real estate market adjustments to the lower development potentials of the Plan and Alternatives 2 - 5 (compared to the No Project Alternative, Alternative 1) would be increased activity in existing and newly developed space. The consequence of this adjustment (and of others, such as conversions and demolition) would be that the differences among the Plan and Alternatives in C-3 District office employment would not be as great as the differences in new office construction. The same rationale applies to differences between retail space and employment in the Plan and each Alternative.

/6/ This comparison of the Plan and Alternatives does not consider the effects of the South of Market Industrial Conservation Special Use District (SUD), which covers part of Subarea 3, an area that includes those uses vulnerable to conversion. The potential effects of a longer term implementation of the South of Market SUD on real estate development patterns are discussed for the Plan in Section V.B, Land Use and Real Estate Development Mitigation. These considerations would apply under all Alternatives.

/7/ The specific housing policies of the Downtown Plan are considered independent of the City's Office-Housing Production Program requiring housing assistance in proportion to office space added. The OHPP is the housing requirement analyzed for Alternative 5. The potential implications of a housing requirement for the Plan forecasts are considered in Section V.D, Residence Patterns and Housing Mitigation and are compared with the citywide housing production forecasts for the Alternatives in Section VII.D.

/8/ The implications of City policies in other areas, such as the South of Market SUD are discussed for the Plan in Section V.B, Land Use and Real Estate Development Mitigation. Similar effects would occur under the Alternatives.

/9/ The affordability requirement for housing produced as a condition of office development is only incorporated in the Alternative 4 C-3 District policies. It is not included in the Office-Housing Production Program (OHPP), which is incorporated in the Alternative 5 policies. The effects of a program similar to the OHPP implemented in tandem with the Downtown Plan are considered in Section V.D, Residence Patterns and Housing Mitigation and are compared to the effects of the Alternatives in Section VII.D.

C. BUSINESS AND EMPLOYMENT

Introduction

Business activity and employment in the C-3 District would grow at a relatively rapid rate between 1984 and 2000 under the Downtown Plan and all five Alternatives. The policies of the Plan and the Alternatives would facilitate C-3 District employment growth to the extent that the space that could be supplied under the policies is of the type and price to match business expansion needs.

The differences in employment effects among the Plan and the Alternatives would be less than the differences in effects on the development of space in the C-3 District. This is largely due to expected increases in office employment densities under those policies which result in lower amounts of office space supplied. Under the Plan and Alternatives 4 and 5, it is assumed that 1981 employment densities for each office activity would increase five percent by 2000, as businesses faced with increasing rents take actions to use space more efficiently. Under Alternative 3, the density for each office activity is assumed to increase 1.5 percent by 2000. Under Alternative 2, the increase is assumed to be 0.5 percent. Office employment densities under Alternative 1 (No Project) are assumed to remain constant between 1981 and 2000, reflecting the space supply conditions of this Alternative./1/

The range of employment growth represented by the forecasts for the Plan and Alternatives reflects differences in business location or expansion decisions according to the space supply and rent conditions under each set of policies./2/ For example, lower employment growth than in the No Project Alternative (Alternative 1), indicates that some business activities that would have newly located, expanded, or remained in the C-3 District under real estate market conditions relatively similar to those that would exist hrough 1990 would not do so under conditions in which the supply of desired space is lower and rents are higher. This location decision could be made by mall firms or by functions within larger organizations (e.g. a data center elocating at a site separate from its headquarters office). The behavior hat results in these differences would occur gradually over time, as an outcome of the location evaluations made when leases expire, when new businesses are formed, or when expansion space is required. Lower employment growth in any business activity, in the Plan or any of the Alternatives, does not necessarily indicate that jobs currently in the C-3 District would leave the area.

Comparison of C-3 District Forecasts

Table VII.C.1 shows total C-3 District employment in 1984, 1990 and 2000, for the Plan and Alternatives. The 1984 total is the same in all cases, because this growth would be absorbed in projects already under construction in the C-3 District. Similarly, the 1990 forecast is the same for the Plan and Alternatives due to the large amount of space supplied in projects already approved for development in the C-3 District and in YBC./3/ For the Plan and all Alternatives, the rate of employment growth would become slower after 1990. By 2000, total C-3 District permanent employment would range from about 387,000 (under Alternative 1, No Project) to 369,000 (under Alternative 5). The Downtown Plan forecast of 372,000 jobs falls near the lower end of this range. Compared to the Plan, there would be more job growth under Alternatives 1, 2 and 3 and less under Alternatives 4 and 5. Between 1984 and 2000, employment growth under the Plan would be about 15 percent less than the amount that would occur under the highest forecast (Alternative 1) and about five percent more than would occur under the lowest forecast (Alternative 4).

Differences in the amount of construction employment (person-years of construction labor) reflect differences in building activity among the Plan and Alternatives. Alternative 1 would generate the highest annual average construction employment between 1990 and 2000 (about 5,400 person-years) and Alternative 5 would generate the lowest annual average construction employment (about 4,200 person-years). Construction employment under the Plan would be almost the same as Alternative 5.

The differences among the employment effects of the Plan and Alternatives are most apparent in a comparison of employment growth by business activity for each set of policies. This information is summarized in Table VII.C.2. Office business activities grow the most in terms of absolute amounts in every

TABLE VII.C.1: C-3 DISTRICT EMPLOYMENT FORECASTS FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1984-2000

			2000					
				Alternative				
	1984	1990	Downtown Plan	1	2	3	4	5
Total Permanant Employment	280,900	322,500	372,100	387,200	384,100	379,800	367,600	368,800
Employment Growth From 1984	--	41,600	91,200	106,300	103,200	98,900	86,700	87,900
Compound Annual Growth Rate From 1984	--	2.33%	1.77%	2.03%	1.98%	1.90%	1.70%	1.72%
Permanent Employment Growth 1990 - 2000			49,600	64,700	61,600	57,300	45,100	46,300
Average Annual Construction Employment 1990 - 2000			4,300	5,400	5,300	4,900	4,300	4,200

NOTE: All numbers are rounded to the nearest 100 jobs.

SOURCE: Recht Hausrath & Associates

TABLE VII.C.2: C-3 DISTRICT EMPLOYMENT BY BUSINESS ACTIVITY FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1984, 1990 AND 2000

	1984	1990		2000											
				Total Employment						% Change from 1990					
					Alternative						Alternative				
Business Activity	Total Employment	Total Employment	% Change From 1984	Downtown Plan	1	2	3	4	5	Downtown Plan	1	2	3	4	5
Management/Technical Office	185,900	216,200	16	251,600	261,600	259,500	257,000	247,100	248,500	16	21	20	19	14	15
Trade/Customer Service Office	37,400	43,200	15	51,900	54,300	53,600	57,900	50,800	51,600	20	26	24	23	18	19
Retail Trade	23,200	25,400	9	27,800	29,000	29,000	28,500	28,000	28,000	10	14	14	12	10	10
Hotel	13,800	16,300	18	19,900	20,600	20,600	20,600	20,200	20,200	22	26	26	26	24	24
Cultural/Institutional/ Educational	8,300	9,300	11	9,300	10,100	9,900	9,900	9,100	9,300	--	9	6	6	-2	--
Industrial/Warehouse/ Automotive/Parking	6,500	5,600	-13	4,400	3,700	3,700	3,300	5,300	4,100	-22	-34	-34	-41	-7	-27
Building Maintenance	5,800	6,500	13	7,200	7,900	7,800	7,600	7,100	7,100	11	21	20	17	9	9
TOTAL Permanent Employment	280,900	322,500	15	372,100	387,200	384,100	379,800	367,600	368,800	15	20	19	18	14	14

NOTE: All numbers are rounded to nearest 100 jobs.

SOURCE: Recht Hausrath & Associates

case. Because office activities dominate existing downtown economic activity and are such a large portion of the forecast growth, the pattern of change for office activities determines the overall change for the C-3 District.

Within the large category of office activities, there are a variety of business activities and functions which would be affected in different ways by the policies of the Plan and Alternatives. Generally, lower growth of office employment is attributable to lower growth in those activities most sensitive to the costs of space and which place less value on a central C-3 District location. Typical examples are small business service firms and the large-space-using functions (e.g. data processing activities) of large office operations. There are more differences among the Plan and Alternatives in the growth of these types of office activities than there are in the growth of headquarters and other executive functions in the C-3 District.

There is less variation among the Plan and Alternatives in the forecast growth in retail and hotel activities. Compared to office activities, growth in these sectors is even less dependent on downtown land use and zoning policies.

The retail employment (and space) forecasts for the Plan and Alternatives were based on forecasts of retail sales growth in the C-3 District from 1981 to 2000. This sector merits further discussion because of the differences among the Plan and Alternatives in how retail sales growth would be accommodated in the C-3 District. Table VII.C.3 shows estimates of total C-3 District retail sales, employment, and space for the 1981 to 2000 period, for the Plan and each Alternative. Strong retail sales growth is forecast in all cases, with the annual compound rate of growth from 1981 to 2000 ranging from a low of 2.2 percent (Plan) to a high of 2.4 percent (Alternative 1, No Project.) Sales are forecast to continue strong, and are not as affected by the Plan or the Alternatives as are retail employment and space for several reasons. There would be less increase in retail space under those policies which would result in fewer new office buildings (containing some retail space). There are only a limited number of suitable sites for major free-standing retail development. At the same time, retail spending by C-3 District workers would not be reduced in proportion to the smaller amount of office space,

TABLE VII.C.3: C-3 DISTRICT RETAIL ACTIVITY FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1981-2000

				2000					
					Alternative				
	1981	1984	1990	Downtown Plan	1	2	3	4	5
Retail Sales (Millions of Constant 1982 Dollars)	$1,200.0	$1,292.5	$1,500.7	$1,820.1	$1,868.9	$1,864.1	$1,858.3	$1,828.5	$1,830.2
Retail Employment	22,190	23,200	25,370	27,820	29,040	28,960	28,460	28,000	28,030
Retail Space (Thousands of Gross Sq. Ft.)	7,756	8,220	8,949	9,633	10,288	10,192	9,945	9,766	9,773
				Compound Annual Growth Rate 1981-2000					
Retail Sales				2.22%	2.36%	2.35%	2.33%	2.24%	2.25%
Retail Employment				1.20%	1.43%	1.41%	1.32%	1.23%	1.24%
Retail Space				1.15%	1.50%	1.45%	1.32%	1.22%	1.22%

SOURCE: Recht Hausrath & Associates

because employment densities (in both existing and new office space) are forecast to increase. Consequently, there would be more spending to support higher levels of sales in existing and new retail space under the C-3 District policies with lower amounts of new office development.

These sales could be accommodated through the remodelling of ground floors and basements to create more retail space and more efficient selling areas in existing buildings. The sales volume of existing stores could increase and lower sales volume tenants could be replaced by stores and restaurants with higher sales volume. These types of changes in the retail activity in existing space would be most evident in the Plan and Alternatives 4 and 5.

Although the overall change for cultural/institutional and educational activities is small in all cases, there is a wider range of effects among the Plan and Alternatives. Those policies that accommodate the most growth (Alternatives 1, 2, and 3) would be able to absorb the small amount of growth forecast for these generally rent-sensitive activities. In cases where there is less space supplied (Alternatives 4, 5, and the Plan), these uses would not be able to compete with groups with stronger demand for downtown locations. Finally, industrial/warehouse and automotive activities would decline in the C-3 District under the Plan and all Alternatives. The range of percentage change reflects different amounts of pressure on existing C-3 District space for either demolition or conversion.

Comparison of C-3 District Job Opportunities and Labor Needs

There would be differences among the Plan and the Alternatives in job opportunities in the C-3 District. Comparison of the 1990 to 2000 changes for occupation and wage/salary categories highlights these differences. Table VII.C.4 and VII.C.5 show the 1990-2000 employment growth (both absolute and percentage change) by occupation and wages and salaries for the Plan and the five Alternatives.

For the Plan and all Alternatives, professional, managerial and clerical jobs would increase the most between 1990 and 2000. Increases in these opportunities would be greater for Alternatives 1, 2, and 3 than for the Plan,

TABLE VII.C.4: C-3 DISTRICT EMPLOYMENT BY OCCUPATION FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1990 AND GROWTH 1990 - 2000 (a)

		1990-2000 Employment Growth											
				Alternative									
		Downtown Plan		1		2		3		4		5	
Occupation	Total 1990 Employment	No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change
Professional/ Technical	82,840	14,670	17.7	18,680	22.5	17,700	21.4	16,670	20.1	12,990	15.7	13,470	16.2
Managerial/ Administrative	62,880	10,440	16.6	13,640	21.7	12,940	20.6	12,180	19.4	9,270	14.7	9,800	15.6
Clerical	94,930	14,440	15.2	19,230	20.3	18,360	19.3	17,330	18.3	12,440	13.1	13,300	14.0
Sales	20,740	2,240	10.8	3,090	14.9	2,990	14.4	2,670	12.9	2,240	10.8	2,300	11.1
Service	31,040	4,090	13.2	5,710	18.4	5,540	17.8	5,170	16.7	4,180	13.5	4,230	13.6
Crafts/Operatives and Other	30,100	3,710	12.3	4,350	14.5	4,010	13.3	3,210	10.7	3,990	13.3	3,190	10.6
TOTAL	322,530	49,590	15.4	64,700	20.1	61,540	19.1	57,230	17.8	45,110	14.0	46,290	14.4

NOTE: These forecasts were developed by applying the 1981 distribution of occupations for 18 individual business activity groups (from the Downtown EIR Employer Survey) to the employment forecasts for each group. Thus, the changes in occupations shown above arise from a changing mix of C-3 District business activities. While it is also possible that the distribution of occupations within a business activity could change over time, data are not available for evaluating these changes. See Appendix H for more detailed discussion.

(a) Includes C-3 District permanent employment and excludes construction labor.
(b) Constant 1982 dollars.

SOURCE: Recht Hausrath & Associates

TABLE VII.C.5: C-3 DISTRICT EMPLOYMENT BY WAGE AND SALARY CATEGORY FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1990 AND GROWTH 1990-2000 (a)

		1990-2000 Employment Growth											
				Alternative									
Wages and Salaries (b)	Total 1990 Employment	Downtown Plan		1		2		3		4		5	
		No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change
Less than $12,000	35,790	4,380	12.2	6,240	17.4	5,910	16.5	5,470	15.3	3,680	10.3	4,130	11.5
$12,000 - 14,999	61,530	7,300	11.9	9,590	15.6	9,200	15.0	8,160	13.3	7,550	12.3	6,900	11.2
$15,000 - 24,999	109,220	16,780	15.4	22,110	20.2	21,030	19.3	19,660	18.0	14,990	13.7	15,630	14.3
$25,000 - 49,999	85,280	15,120	17.7	19,480	22.8	18,450	21.6	17,340	20.3	13,350	15.7	14,000	16.4
$50,000 - 74,999	18,270	4,030	22.1	4,870	26.7	4,640	25.4	4,370	23.9	3,680	20.1	3,730	20.4
$75,000 and Above	12,440	1,980	15.9	2,410	19.4	2,310	18.6	2,230	17.9	1,860	15.0	1,900	15.3
TOTAL	322,530	49,590	15.4	64,700	20.1	61,540	19.1	57,230	17.7	45,170	14.0	46,290	14.4

NOTE: These forecasts were developed by applying the 1981 distribution of jobs among wage and salary categories for 18 business activity groups (from the Downtown EIR Employer Survey) to the employment forecasts for each group. The changes shown above arise from a changing mix of C-3 District business activities. While it is possible that the distribution of wages and salaries within a business activity could change over time, data are not available for evaluating these changes. See Appendix H for more detailed discussion.

(a) Includes C-3 District permanent employment and excludes construction labor.
(b) Constant 1982 dollars.

SOURCE: Recht Hausrath & Associates

while they would be less than the Plan for Alternatives 4 and 5. Differences among the Plan and Alternatives would not be so marked for sales, service, crafts and operative occupations.

Job opportunities in the $15,000-$24,999 wage/salary category would increase the most for the Plan and all Alternatives. Opportunities in the higher wage/salary categories ($25,000-$49,999 and $50,000-$74,999) would show strong percentage growth between 1990 and 2000 in all cases. The estimates for the Plan fall in the middle of the range established by the Alternatives, closer to the lower end than the higher end.

In summary, the Plan would offer a moderate increase in C-3 District job opportunities. That increase would be less than in the higher growth Alternatives (Alternatives 1, 2, and 3) and more than in the lower growth Alternatives (Alternatives 4 and 5). The differences among the Plan and Alternatives would be relatively small for entry-level sales and service workers. Non-office crafts, operatives and laborers would have somewhat more C-3 District opportunities under the Plan than under the higher growth Alternatives, as some of the areas in which light industrial and distribution activities are now located would be protected from large scale office development. The Plan's outcome would be similar to the effects of policies in Alternatives 4 and 5, with the exception of the effects of re-directing office development to Subarea 2 (south of Natoma). A consequence of this part of the Plan is to put more pressure on existing business activities in this area than would occur in any of the Alternatives./4/

Comparison of Citywide Effects on Employment

The Plan and Alternatives would have different effects on citywide employment growth. The differences among the Plan and Alternatives would be evident in both the pattern of growth and the total amount of growth. As in the discussion of citywide employment impacts of the Downtown Plan (see Section IV.C.), three geographic areas are considered: the C-3 District, areas near the C-3 District (south of Market to China Basin including Mission Bay, Civic Center, Northern Waterfront and Washington/Broadway Special Use District), and the rest of the City./5/

The amount of employment growth between 1981 and 2000 for the total City would be largest under the No Project Alternative (Alternative 1) and the smallest under Alternative 4./6/ The Downtown Plan would fall near the higher end of this range of total City employment. Total employment for the City under the Plan and the higher growth Alternatives (Alternatives 1, 2 and 3) would be more similar than would the forecasts for the C-3 District under these policies. This is because a portion of the growth that would be accommodated in the C-3 District under the higher growth Alternatives is assumed to accept locations outside the C-3 District, but still in the City, when there would be more competition for C-3 District space (as under the Downtown Plan). Most of this expansion would occur south of the C-3 District, assuming City policies allowed and encouraged such development./7/ If City policies are designed to prevent the expansion of the downtown, then there would be less employment growth in these areas and, consequently, less total growth for the City under the policies of the Plan and the other lower C-3 District growth Alternative (Alternative 5)./8/

Although C-3 District employment growth differs among the Plan and Alternatives, total C-3 District employment would increase as a percentage of citywide employment in all cases. Similarly, the proportion of total City employment in areas near the C-3 District would also increase. Thus, downtown San Francisco and adjacent areas are expected to increase in relative importance as a location for employment within the City. In other words, more growth and higher rates of growth are expected in these areas, compared to the rest of the City, between 1981 and 2000. Employment growth in areas of the City more distant from the downtown would not vary much among the Plan and Alternatives.

Under the Plan and all Alternatives except Alternative 4, areas near the C-3 District, particularly to the south, would experience more change by 2000 relative to existing (1981) conditions than would either the C-3 District or the rest of the City. This change reflects the expansion of the central downtown area. Comparing the Plan and Alternatives, changes would be greatest under Alternative 5 and the Plan, reflecting the faster pace of this expansion.

Longer Term Perspective

In terms of employment growth in the C-3 District beyond the year 2000, there would be two separate trends that would have opposite effects on the longer term differences among the Downtown Plan and the Alternatives. First, as described in the preceding comparison of land use and real estate development, the differences in amounts of C-3 District development would become smaller over time as a consequence of several factors. This would imply that more similar amounts of space could be provided beyond 2000 to accommodate employment growth under the Plan and all Alternatives than is forecast for the 1990 to 2000 period in each case. Second, on the other hand, the employment density adjustments that would occur under the policies in which office development potentials would be reduced, would not be maintained over the longer term. These employment density adjustments, reflecting the relative scarcity of space and increasing rents, are one of the primary reasons why the differences among the Plan and Alternatives, in terms of employment growth between 1990 and 2000, would be less than the differences in new development. The first trend would have the effect of narrowing the differences in employment growth among the Plan and Alternatives beyond 2000, while the second factor would contribute to greater differences over time.

NOTES - Business and Employment

/1/ The average office employment density for all office business activities in the C-3 District would also change over time as the mix of office activities in the C-3 District changes. This mix would vary among the Plan and Alternatives. Under Alternatives 1 and 2, the average office density would be one to two percent less in 2000, primarily reflecting the increasing relative proportion of office employment represented by those activities that are less dense, such as corporate headquarters and business services. Changes in the mix of office activities (with relatively more employment growth in the less dense activities) would offset the increase in density assumed for individual office activities under Alternative 3, so that there would be no change from 1981 densities in the year 2000. Under Alternatives 4 and 5, and the Plan, changes in the mix of office activities, combined with the five percent increase in density for each activity, would result in a three to four percent increase in the overall average office employment density by the year 2000.

NOTES - Business and Employment (Continued)

/2/ See "Growth Management Alternatives for Downtown San Francisco: The Downtown EIR Consultant's Report", Environmental Science Associates, Inc., May 1983 (hereinafter Consultant's Report), for a detailed discussion of the effects of Alternatives 1 through 5 on business and employment in the C-3 District. In particular, see Section V.C, Business and Employment Impacts, and Appendix H, Employment Analysis. Section V.B. and Appendix G describe the real estate development implications of the five Alternatives. Section V.C is hereby incorporated by reference into this EIR and summarized in the text of this section (VII.C).

/3/ See note 2 in the preceding section on the land use and real estate development impacts of the Plan and the Alternatives (Section VII.B) for a discussion of how the projects assumed to be built between 1984 and 1990 compare.

It is important to understand that the forecasting methodology follows the logic that space is built to accommodate employment growth and not vice versa. Employment growth potentials were forecast first and then compared to the supply of space which could be made available under the policies of the Downtown Plan and each Alternative. The employment forecasts for 1984 and 1990 are the same for the Plan and the Alternatives because it was determined that similar amounts and types of space could be provided to accommodate the employment growth forecast for these time periods. (Although there are some differences in the specific projects to be built by 1990.) They are not the same because employment was assumed to "fill up" the space built in each time period. In fact, by 1984, the employment forecast does not "fill up" all of the space assumed to be built by then. By 1990, the supply of space and employment would be more "in balance". The employment forecasts beyond 1990 differ among the Plan and the Alternatives because, by that time, newly adopted policies for the C-3 District would have had an effect on the supply of space that could be provided.

/4/ In 1990, 16 percent of all C-3 District employment in industrial/warehouse/automotive and parking business activities would be located in Subarea 2. Total C-3 District employment in this category is forecast to decline by about 20 percent between 1990 and 2000, under the Downtown Plan. In Subarea 2, there would be a 30 percent decrease in industrial/warehouse/automotive and parking employment under the Plan.

/5/ See map, Figure H.2, at end of Appendix H.

/6/ The Alternative 4 housing production requirement would apply to office construction and conversion throughout the City. The costs of this requirement would have the greatest deterrent effect on office development outside the prime areas of the C-3 District, where the costs could be less easily passed along to tenants.

/7/ For the higher C-3 District growth Alternatives, expansion of the downtown outside the C-3 District would occur, but not at the same pace, before 2000, as under the Plan and another lower C-3 District growth scenario, Alternative 5.

NOTES - Business and Employment (Continued)

/8/ The South of Market Industrial Conservation Special Use District (SUD), which incorporates part of Subarea 3 of the C-3 District, is not specifically considered in this comparison of the Plan and Alternatives. The potential effects of a longer term implementation of the South of Market SUD on the real estate development and employment effects of the Downtown Plan are discussed in Mitigation Sections V.B and V.C. Generally, similar considerations would apply in the case of all Alternatives, except Alternative 4. Under Alternative 4, application of the housing requirement citywide to new development as well as conversions would be most effective in limiting the expansion of downtown activities beyond the current boundaries of the C-3 District. Under the other Alternatives, the different amounts of employment growth described in the text for areas south of the C-3 District could be accommodated and pressures on existing activities limited to certain areas, depending on where the zoning boundaries for these different areas were drawn.

D. RESIDENCE PATTERNS AND HOUSING

Introduction

Future residence patterns of C-3 District workers will change over time due to a combination of local and regional factors. These include the number and mix of types of future C-3 District jobs, the growth and distribution of labor force, housing, and employment throughout the region, and the propensity of individuals to live in each county and work in the C-3 District as influenced by transportation, lifestyle, demographic, and housing market factors.

Differences in residence patterns among the Downtown Plan and the Alternatives would occur because of differences in both C-3 District employment and the supply of housing in San Francisco. In defining the Plan and Alternatives, the C-3 District policies which result in the most employment growth also result in the least increase in housing units in the City, and those which result in the least employment growth also would have the greatest increase in housing, citywide. This coincidental pairing of effects is demonstrated in the rankings shown on Table VII.D.1.

Comparison of Housing Production Policies and Supply Forecasts

The Plan and the Alternatives incorporate a variety of different policies related to housing production in San Francisco. Some provide incentives for developing housing and some include housing requirements as a condition of office development./1/ Alternative 1 (the No Project Alternative) does not propose any changes in City housing policies, so it would not affect the amount of housing built. In other words, there would be no additional housing supplied that would not be built in any case. Alternatives 2 and 3 include incentives for housing development which would result in additional units supplied in the C-3 District. Alternative 4 incorporates both housing production incentives and a housing requirement for citywide office development. The housing policies of the City's Office-Housing Production Program (OHPP) are incorporated in Alternative 5; these policies would apply citywide. The Downtown Plan includes housing production policies for the C-3 District: in the C-3-G and C-3-S use districts new development would be allowed to exceed the base FAR if the additional space were for housing.

TABLE VII.D.1: COMPARISON OF CITYWIDE HOUSING PRODUCTION AND C-3 DISTRICT EMPLOYMENT GROWTH FOR THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1990-2000

	Downtown Plan	Alternatives				
		1	2	3	4	5
Estimated Net Addition of Housing in San Francisco Because of C-3 District Policy, 1990-2000 (a)	200 (b)	--	1,000	400	4,000 (c)	1,700 (c)
Total Units Built in San Francisco Including Net Addition Because of C-3 District Policy, 1990-2000 (d)	10,200 (b)	10,000	11,000	10,400	14,000 (c)	11,700 (c)
Ranking (6 = Most Units, 1 = Fewest Units)	2 (b)	1	4	3	6 (c)	5 (c)
C-3 District Employment Growth, 1990-2000 (e)	48,500	64,700	61,400	56,800	44,000	45,100
Ranking (6 = Most Growth, 1 = Least Growth)	3	6	5	4	1	2

(a) These figures are only approximate order-of-magnitude estimates developed primarily to illustrate the difference among the Plan and Alternatives. (See Section V.D, Residence Patterns and Housing Impacts in the Consultant's Report for more background on this estimate.)

(b) This estimate does not include units that would be required under the Office-Housing Production Program (OHPP). The OHPP could result in about 1,800 additional units in the City over the 1990-2000 period, as a result of C-3 District office development.

(c) The estimates for Alternatives 4 and 5 include units that would be built to satisfy housing requirements of these Alternatives; Alternative 5 incorporates the OHPP.

(d) These estimates assume an average of about 1,000 units per year added in San Francisco (accounting for demolition and conversion), without the changes in housing policy evaluated in this EIR and in the Consultant's Report. This estimate could range from 600 to 1,500 units per year. (See Appendix I for more discussion of the most likely scenario.)

(e) Rounded to nearest 1,000 employees. Includes permanent employment and annual average construction labor.

The City's OHPP is considered independently of the Downtown Plan. The OHPP is on a separate legislative track and, therefore, it could apply under the Plan or any alternative set of policies chosen for downtown San Francisco. The implications of the OHPP for housing production under the Downtown Plan are summarized in this section and are considered in more detail in Section V.D, Residence Patterns and Housing Mitigation.

Table VII.D.1 presents the 1990-2000 housing forecasts for San Francisco under the Plan and each Alternative. Before consideration of the above-described housing policies related to C-3 District development, the most likely scenario of housing production in San Francisco over the 1990 to 2000 period is estimated to be an average of 1,000 units per year, 10,000 units in total over the 10-year period. Considering the effects of the Plan and Alternatives, it is estimated that housing production in San Francisco could range from a low of 10,000 units (Alternative 1, No Project) to 14,000 units (Alternative 4). The forecasts are derived by considering both the total units built because of the incentives and/or requirements in the various C-3 District policies, and the extent to which the units would be a net addition to citywide housing production during the period. This depends on the number, types, prices and locations of units that would be supplied. The extent to which the total units built represent a net addition varies among the Plan and the Alternatives.

The estimate of housing production between 1990 and 2000 under the Downtown Plan (10,200 total units) falls near the low end of the range set by the Alternatives. A further net addition of 1,800 units could be supplied in the City due to the application of the OHPP in the C-3 District under the Downtown Plan, bringing total housing units built in San Francisco to about 12,000./2/ The amount would be similar to Alternative 5 which incorporated the OHPP. For comparative purposes, it is estimated that about 3,700 net additional units would be produced if the OHPP were applied under Alternative 1 (No Project)./3/ Although more housing would be produced as a consequence of the larger amount of C-3 District office development under Alternative 1, compared to the Plan and Alternative 5, a lower percentage of the units produced to satisfy the requirement would represent a net addition to the citywide housing supply. The estimates of 1,800 and 3,700 net additional units do not include units built to satisfy the requirement that would substitute for units built in any case. These latter units are included in the most likely scenario estimate of 10,000 units over the 1990 to 2000 period. Because a lower percentage of the units built to satisfy the requirement under Alternative 1 would represent a net addition to the citywide housing supply, the range of difference between the Alternative 1 forecast with the OHPP and the Plan/Alternative 5 forecasts with the OHPP is smaller than if similar proportions of the housing produced represented net additions.

Moreover, under both the Plan and Alternative 5, a large proportion of the new office development that would occur in the C-3 District under the No Project Alternative (Alternative 1) could shift to other City locations during this period, primarily south of the C-3 District. The OHPP applies to new office development throughout the City, therefore more housing would be added, perhaps another 1,000 to 1,500 units more than the 1,800 net addition from C-3 District development. Therefore, the difference between Alternative 1 with the OHPP and the Plan/Alternative 5 with the OHPP would be less than the difference between the estimates for the period of 13,700 and 12,000 units, respectively.

Comparison of Residence Patterns

The housing supplied because of C-3 District policies affects the residence patterns of C-3 District workers. If more housing is built in San Francisco more workers could live in the City instead of in other counties of the region. The effect on residence patterns largely depends on the amount of housing built that would not have been constructed without the proposed changes in C-3 District policies. It also depends on how the policies affect the types, prices, or locations of the housing units.

Table VII.D.2 presents the residence patterns forecasts for the Downtown Plan and each Alternative. The forecasts account for the housing production estimates presented in the preceding table and for housing that would be produced in the 1984 to 1990 period (about 6,000 units citywide). The number of C-3 District workers residing in all counties of the region would increase over time under the Plan and all Alternatives. Throughout the 1980's and 1990's, the largest number of C-3 District workers would live in San Francisco under the Plan and all Alternatives. The next largest number would live in the east bay, followed by the south bay, and then the north bay. From 1984 to 2000, the most increase is expected for workers residing in the east bay. The next largest increase would occur for workers living in San Francisco, followed by the increase of those living in the south bay and then the north bay. In terms of percentage increases, the largest percentage growth of C-3 District workers would occur for those residing in the north bay and the east bay, followed by the south bay, and then San Francisco.

The forecasts depend on the characteristics of employment growth under the Plan and Alternatives. For example, in general, office workers are less likely to live in San Francisco than are non-office workers. Therefore, policies for the downtown which would result in relatively less office employment growth compared to retail and hotel employment growth would also result in relatively more workers residing in San Francisco, assuming the same supply of housing. This latter factor (housing supply) is the other critical component of the residence pattern forecast. Its variance among the Plan and Alternatives has been previously described. Generally, assuming the same employment growth, higher levels of housing production in San Francisco would result in more C-3 District workers living in the City.

There would not be much difference among the Plan and Alternatives in the number of C-3 District employees forecast to be living in San Francisco by 2000. The increase would range from nine percent (the Plan and Alternative 5) to 12 percent (Alternative 1, No Project). This is in part because, as mentioned earlier, higher employment growth is paired with lower housing production in some C-3 District policies, while, in others, lower employment growth is paired with higher housing production. Moreover, a large increase in the number of employed City residents in the existing housing stock is

TABLE VII.D.2: RESIDENCE PATTERNS OF C-3 DISTRICT EMPLOYEES UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1-5, 1984-2000

	1984	1990		2000											
				Total Employment						% Change from 1990					
					Alternative						Alternative				
Number of Employees By Place of Residence	Total	Total	% Change From 1984	Downtown Plan	1	2	3	4	5	Downtown Plan	1	2	3	4	5
San Francisco	158,700	173,200	9	189,000	193,100	192,100	190,500	190,200	189,300	9	12	11	10	10	9
East Bay	73,200	90,200	23	110,300	117,200	115,900	114,300	106,900	108,100	22	30	29	27	19	20
South Bay	34,600	40,600	17	47,500	50,800	50,200	49,200	46,200	46,700	17	25	24	21	14	15
North Bay	19,500	23,700	22	29,300	31,100	30,800	30,400	28,400	28,700	24	31	30	28	20	21
Other	100	200		300	300	300	300	200	200						
Total	286,100	327,900		376,400	392,600	389,300	384,700	371,900	373,000						
Percentage Distribution of Employees by Place of Residence															
San Francisco	55.5%	52.8%		50.2%	49.2%	49.3%	49.5%	51.1%	50.8%						
East Bay	25.6	27.5		29.3	29.9	29.8	29.7	28.7	29.0						
South Bay	12.1	12.4		12.7	12.9	12.9	12.8	12.5	12.5						
North Bay	6.8	7.3		7.8	8.0	8.0	8.0	7.7	7.7						
Other	few	few		few	few	few	few	few	few						
Total	100.0%	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%						
Summary for San Francisco															
C-3 District Jobs	286,100	327,900		376,400	392,600	389,300	384,700	371,900	373,000						
-Number Held by Employed Residents	158,700	173,200		189,000	193,100	192,100	190,500	190,200	189,300						
-Percent Held by Employed Residents	55.5%	52.8%		50.2%	49.2%	49.3%	49.5%	51.1%	50.8%						
Employed Residents	352,700	371,400		398,000	397,700	399,000	398,400	402,400	400,200						
-Number Employed in C-3 District	158,700	173,200		189,000	193,100	192,100	190,500	190,200	189,300						
-Percent Employed in C-3 District	45.0%	46.6%		47.5%	48.6%	48.1%	47.8%	47.2%	47.3%						

NOTE: East Bay includes Alameda, Contra Costa, Solano and Napa Counties; South Bay includes San Mateo and Santa Clara Counties; North Bay includes Marin and Sonoma Counties. Numbers are rounded to nearest 100 employees. Number of employees includes permanent employment and annual average construction labor.

SOURCE: Recht Hausrath & Associates

forecast under the Plan and all Alternatives. Consequently, it would be likely that a large part of any growth of the C-3 District workforce would be drawn from the growing local labor force, under the Plan and all Alternatives. This minimizes the differences among the Plan and Alternatives in the number of C-3 District employees forecast to be living in San Francisco.

The differences among the Plan and Alternatives in the residental distribution of C-3 District workers outside San Francisco are primarily attributable to differences in the forecast of residents in San Francisco. This is because the propensity to live and work in San Francisco is expected to remain high. Because the San Francisco forecast does not vary much, the forecasts for the region, outside San Francisco, also do not vary much. The differences among the Plan and Alternatives are most evident in comparing the changes in workers residing in each county over the 1990 to 2000 period. Generally, the increase in C-3 District workers living in each part of the region is largest when C-3 District employment growth is largest and San Francisco housing growth is smallest. High levels of C-3 District employment growth would be dominated by office employment growth, and proportionally more of these employees would be likely to live outside San Francisco. Lower levels of housing production would limit the ability of C-3 District workers to live in the City. Table VII.D.2 shows that the most growth of C-3 District workers residing in the east bay, south bay, and north bay would occur under Alternative 1 (No Project) and the lowest growth would occur under Alternative 4. Alternative 2 is most similar to Alternative 1, and the Plan and Alternative 5 are most similar to Alternative 4. Alternative 3 falls in the middle of the range. The pattern is the inverse of that for C-3 District workers living in San Francisco.

All of the increase in C-3 District workers forecast to reside in each county throughout the region does not represent a net addition of population in the region or in each county. This is primarily because labor force participation within the existing population is expected to increase.

Furthermore, the differences among the Plan and Alternatives in the number of C-3 District workers residing in each county do not necessarily represent differences in the number of employed residents in the region or in each county. Most of the differences in C-3 District employment among the Plan and Alternatives would be made up elsewhere in the region. These shifts in the location of regional employment imply that the differences in employed residents in the region would be considerably less than the differences among the Plan and Alternatives in the number of employed residents working in the C-3 District.

Comparison From the Perspective of City Residents

Table VII.D.2 also presents information related to differences among the Plan and Alternatives for San Franciscans, both existing and future residents. The number of San Franciscans working in the C-3 District will be affected by the growth of C-3 District jobs and the effect of C-3 District policies on the growth of housing in San Francisco. Both C-3 District employment growth and citywide housing growth would result in increased numbers of C-3 District workers living in San Francisco.

The effects of the Plan and Alternatives are evident in the forecasts for 2000. The differences reflect three factors. One is the mix of types of jobs, such as the number of office jobs relative to retail or hotel jobs. A second factor is the amount of job growth relative to the growth of labor and housing in the City and the rest of the region. For the same forecast of employed residents in San Francisco, a larger number of C-3 District jobs would mean a larger number of San Francisco residents working in the C-3 District but a smaller percentage of C-3 District jobs held by City residents. A third factor is the effect of C-3 District policies on the production of housing in San Francisco. For the same growth of C-3 District jobs, more housing would mean a larger number of San Francisco residents working in the C-3 District and a larger percentage of C-3 District jobs held by City residents. The forecasts in Table VII.D.2 reflect differences in all three of these factors.

The number of San Francisco residents working in the C-3 District would increase from 158,700 in 1984 to 173,200 in 1990, and to 189,000-193,100 in 2000, depending on the policies for the C-3 District. The Plan establishes the low end of the range, while Alternative 1 (No Project) sets the high end of the range. The differences are not large. If the OHPP were applied under either the Plan or Alternative 1, the number of San Franciscans working in the C-3 District would be higher in both cases because of the additional housing supply in the City.

There is less difference in the number of C-3 District workers who would be City residents among the Plan and Alternatives than there would be if the C-3 District policies with the least employment growth (Alternatives 4 and 5) did not also result in the most housing development (due to the incorporation of housing production requirements in these Alternatives). Thus, the differences in residence patterns due solely to differences in the amount of C-3 District employment would be greater than shown in Table VII.D.2.

The percentage of C-3 District jobs held by residents would decline over time regardless of C-3 District policies. This is due to a combination of two factors. First, future labor force and housing growth in San Francisco will not increase in proportion to C-3 District job growth. Second, labor force and housing growth elsewhere in the Bay Area are expected to increase at a faster pace than in San Francisco. Therefore, it is more likely that an increasing proportion of C-3 District jobs will be held by non-San Francisco residents.

The percentage of City residents who work in the C-3 District is a more direct measure of the role of these jobs in employing San Franciscans. Over time, San Franciscans employed in the C-3 District will represent an increasing percentage of all employed residents. As shown in Table VII.D.2, the total number of San Francisco residents who are employed is forecast to increase, the number who are employed in the C-3 District will increase, and the percentage that the latter represents of the former will also increase. This trend occurs under the Plan and all Alternatives.

There are several reasons for this trend. The propensity to live and work in San Francisco will remain high. More housing is forecast to be added in the City in the future than in the past decade, regardless of C-3 District policies. As this new housing is built, it could be occupied by proportionally more C-3 District workers since they are likely to include many who have the preferences and resources for the types of new housing built. Also, a larger share of the new housing is expected to be built in the downtown area or in close proximity to it. In addition, as turnover of the existing stock occurs, some who work in the C-3 District may replace others who did not work there.

The differences among the Plan and Alternatives reflect differences in both the amount of C-3 District job growth and in the amount of housing built in the City. For the same amount of employment growth, additional housing production would result in more San Francisco residents working in the C-3 District and fewer employees commuting from other counties. The types, prices, and locations of housing built in San Francisco would appeal to households of C-3 District workers. Since not all additional units would be occupied by C-3 District workers, however, the percentage of employed residents working in the C-3 District would be lower, the greater the number of additional units. Separate from differences in the amount of housing added, the C-3 District policies with more C-3 District employment growth would tend to have a larger percentage of City residents who work in the C-3 District.

Under Alternative 1 (No Project), residents employed in the C-3 District would represent the largest percentage of employed City residents, 48.6 percent in 2000. Alternative 1 has the most C-3 District employment and the least housing. Under Alternative 4, those employed in the C-3 District would represent the smallest percentage of City residents, 47.2 percent in 2000. Alternative 4 has the least C-3 District employment and provides the most housing in the City. Alternative 5 and the Plan are most similar to Alternative 4, Alternative 2 is similar to Alternative 1, and Alternative 3 falls in the middle of the range.

Comparison of Housing Market Effects

The housing market situation arises out of a local, regional, and national context. While downtown employment and employment growth play an important role, the housing problems of San Francisco residents are not solely or primarily due to downtown growth. Other important factors include changing lifestyles, changing demographic and household characteristics, rising household incomes, employment growth, the attractiveness of the Bay Area as a place to live, the availability and cost of financing, the attractiveness of real estate as an investment, no-growth policies in some communities and the increasing scarcity of land in others.

The housing impacts of concern here are those that would arise from future differences in the City's housing market because of the choice of the Downtown Plan or an Alternative. Differences could occur because employment growth results in increased competition for the City's stock of housing and rents and prices would be higher than they otherwise would have been. Differences could also occur because new housing development reduces the competition for the City's housing stock and rents and prices would be lower than they otherwise would have been.

In general, employment growth would mean an increase in the number of San Francisco residents working in the C-3 District, including both an increase in the number of existing City residents newly employed in the C-3 District, and an increase in the number of C-3 District workers who move into San Francisco. If there were no increase in the housing supply, more C-3 District employment would result in more competition for the City's housing stock.

The construction of additional housing would tend to offset the increased competition for housing resulting from employment growth. It would also provide more options for those desiring to live in San Francisco, and might, therefore, result in even more households moving into the City. Nevertheless, the additions to the housing stock would be likely to result in less upward pressure on rents and prices than would exist if the housing development had not occurred.

The Plan and all Alternatives would result in increased competition for San Francisco housing and, consequently, upward pressure on City housing prices and rents. Alternative 1 (No Project) would result in the most competition from C-3 District workers for housing in San Francisco and the most upward pressure on housing prices and rents. Some of this pressure would be alleviated, if the OHPP were implemented in tandem with Alternative 1. Alternative 4 would result in the least competition for San Francisco housing and the least upward pressure on prices and rents. The effects of the Plan (some upward pressure on housing prices and rents) would be in the middle of this range. The implementation of the OHPP in tandem with the Downtown Plan would reduce the upward pressure on housing prices and rents in San Francisco to almost the level of Alternative 4.

To the extent that housing prices and rents would be higher than they otherwise would have been, some people may decide not to move into San Francisco, current residents who rent would find it more difficult to buy a home, and some existing residents would move out of the city if they find a more acceptable housing product elsewhere. Others would continue to live in San Francisco and to pay higher prices and rents for City housing.

Employment elsewhere in San Francisco is also a factor. If those C-3 District policies with lower employment in the C-3 District (and less housing market effects from C-3 District workers) would result in more employment growth elsewhere in the City (and subsequent housing market effects from those workers), then there may be less difference in housing market effects viewed from the citywide perspective. Further, if these types of shifts occurred under some C-3 District policies but not under others (e.g. there might be relatively less shift under Alternative 4 because of the citywide application of many of the policies of this Alternative, including the housing requirement), then the differences among the Plan and Alternatives could be greater than discussed here.

NOTES - Residence Patterns and Housing

/1/ See "Growth Management Alternatives for Downtown San Francisco: The Downtown EIR Consultant's Report", Environmental Science Associates, Inc., May 1983 (hereinafter Consultant's Report), for a detailed discussion of the effect of the C-3 District Alternatives on housing development. In particular, see Section V.D, Residence Patterns and Housing Impacts. Section V.D. is hereby incorporated by reference into this EIR and is summarized in the text of this section (VII.D).

NOTES - Residence Patterns and Housing (Continued)

/2/ The number of units produced to meet the OHPP requirement would be greater than the net addition, but some of the requirement would substitute for units that would be produced in any case.

/3/ This estimate would be high to the extent that the additional development costs of the OHPP resulted in less new office space developed in the C-3 District than would otherwise occur under Alternative 1. The difference would be small.

E. TRANSPORTATION AND CIRCULATION

Travel Demand

The Downtown Plan would cause an increase in peak-period and peak-hour travel from the C-3 District in the period 1984 to 2000 of about 31% (about two percent per year compounded annually). Table VII.E.1 shows C-3 District peak-hour travel demand from the Downtown Plan and the five Alternatives for the year 2000. Of the five Alternatives, Alternative 4 would generate the fewest total peak-hour person trip-ends and Alternative 1 would generate the most. However, there is less than four percent difference among the numbers of total peak-hour person trip-ends generated by the Alternatives and the Downtown Plan.

From a transportation standpoint, the Downtown Plan and the Alternatives can be separated into two groups, each with similar overall transportation impacts. Alternatives 1, 2 and 3 comprise the "high" group and Alternatives 4, 5 and the Downtown Plan comprise the "low" group. Differences among the Plan and the Alternatives in terms of the total peak-hour vehicle trip-ends generated would conform to the two groupings.

Single-occupant auto use by C-3 District employees under the Downtown Plan has been projected to decline as a percentage of the overall modal split in the period 1984 to 2000. The same type of pattern would be expected under all of the Alternatives, as shown in Table VII.E.1 where the numbers of work vehicle trip-ends in 2000 are equivalent to the number in 1984 even though overall peak-hour travel demand would increase by about 30% in the same period of time.

While the amount of travel generated by the C-3 District in the year 2000 under the Downtown Plan and the five Alternatives would differ, the increase in the 1984-2000 period for peak-hour and peak-period travel from non-C-3 District sources (the remainder of San Francisco and the rest of the Bay Area) on the transportation network serving San Francisco would be the same under all of the C-3 District development conditions analyzed. Peak-hour and peak-period travel from non-C-3 District sources on the transportation network would continue to increase, thus increasing overall travel demand on the transportation network serving San Francisco in the period 1984 to 2000.

TABLE VII.E.1: COMPARISON OF P.M. PEAK-HOUR TRANSPORTATION IMPACTS, 1984, 1990, 2000 UNDER THE DOWNTOWN PLAN, AND 2000 UNDER ALTERNATIVES 1 THROUGH 5

			2000					
			Downtown	Alternative				
	1984	1990	Plan	1	2	3	4	5
Person Trip-ends(a)								
Work	125,200	144,100	166,600	172,800	171,400	169,600	164,300	164,900
Other	49,200	55,100	61,300	63,900	63,400	62,600	61,000	61,000
Total	174,300	199,200	227,800	236,800	234,800	232,200	225,300	225,900
Vehicle Trip-ends(a)								
Work	31,400	33,800	36,100	37,300	37,100	36,800	35,300	35,600
Other	3,600	3,600	3,500	3,700	3,600	3,600	3,400	3,400
Total	35,000	37,400	39,500	41,000	40,700	40,300	38,800	39,100
Transit Ridership(b)								
Muni								
Northeast	7,100	7,900	8,800	9,000	8,900	8,800	8,900	8,900
Northwest	8,200	9,200	10,100	10,300	10,200	10,100	10,200	10,200
Southwest	13,500	15,100	16,600	16,600	16,500	16,400	16,300	16,300
Southeast	5,300	6,200	7,400	7,300	7,300	7,300	6,900	7,000
BART								
Transbay	16,100	20,500	27,900	29,400	29,200	28,800	27,400	27,400
SW of Civic Center	7,700	8,800	10,100	10,500	10,400	10,300	10,000	10,000
AC Transit	9,100	10,500	10,300	10,700	10,600	10,400	10,000	10,100
Golden Gate Bus	5,300	6,600	8,500	9,000	8,900	8,800	8,000	8,400
Golden Gate Ferry	800	1,100	1,500	1,500	1,500	1,400	1,300	1,400
Tiburon Ferry	200	200	300	300	300	300	300	300
SamTrans	1,900	2,400	3,100	3,200	3,200	3,100	2,900	3,000
CalTrain (SPRR)	3,100	4,000	4,900	5,100	5,000	4,900	4,800	4,800
Regional Traffic Volumes(b)								
Bay Bridge (I-80)	8,540	9,180	9,790	10,090	10,080	10,050	9,600	9,650
Golden Gate Bridge (US-101)	6,740	7,020	7,150	7,370	7,330	7,280	7,130	7,110
US-101 (South of Harney Way)	7,390	7,890	8,400	8,580	8,550	8,520	8,330	8,330
I-280 (Between Alemany Blvd. & San Jose Ave)	7,610	8,120	8,650	8,830	8,800	8,770	8,580	8,580

(a) C-3 District travel only.
(b) Includes travel from the C-3 District, from outside the C-3 District, and outside San Francisco.

SOURCE: TJKM Transportation Consultants

Public Transportation

Because of the small differences in peak-hour travel demand among the Alternatives and the Downtown Plan, there are similarly small differences among the amount of peak-hour transit demand generated by the Alternatives and the Plan. Peak-hour transit demand on Muni in the year 2000 under the Downtown Plan would increase about 25% over 1984 levels in the Northeast, Northwest and Southwest corridors and about 40% in the Southeast corridor. The total (C-3 District and non-C-3 sources) travel that would occur under the five Alternatives on Muni would differ from the travel under the Plan by from less than one percent to about six percent, depending upon corridor.

The Downtown Plan would increase peak-hour demand on the other agencies, with the exception of AC Transit, between 30% and 70% during the period 1984 to 2000. Overall peak-period transit travel would be expected to increase about 30% between 1984 and 2000 under the Downtown Plan. As shown in Table VII.E.1, total transit demand under the five Alternatives would differ from the Plan's demand by from less than one percent to about eight percent. Impacts on the transit agencies from the Alternatives would approximate the impacts from the Plan.

Traffic

Total travel demand during the peak hour at regional screenlines in the East Bay and Peninsula corridors would be expected to increase about 15% between 1984 and 2000 under the Downtown Plan. Operating conditions at the regional screenlines would be at or near capacity in Level of Service E. The total travel demand under the five Alternatives would differ from the demand under the Plan by from less than one percent to about five percent. Impacts at the regional screenlines under the Alternatives would be similar to the impacts under the Plan.

Peak-hour conditions would be expected to continue to deteriorate at all of the downtown intersections by the year 2000 under the Downtown Plan. Alternative 5 would most closely approximate the Plan's impacts on local streets and intersections in the downtown. Alternative 1 (No Project) would have the most impact on the downtown street system.

Parking

Parking demand from the C-3 District in the year 2000 under the Downtown Plan would increase by about 28% over 1984 levels. Among the Alternatives, Alternative 1 (No Project) would have parking demand about four percent greater than the Downtown Plan and Alternative 4 would have about one percent less parking demand than the Plan. Alternative 5 would have parking demand equivalent to the Plan's demand. Alternatives 2 and 3 would have parking demands greater than Alternative 5 but less than Alternative 1.

Pedestrian Circulation

By the year 2000, development under the Downtown Plan would increase the number of C-3 District users which would lessen pedestrian mobility in the C-3 District. The Plan's focus on new areas of development (i.e. in Subarea 2 rather than in Subarea 1) where pedestrian flows are lower in the 1981/82 conditions would account for a lower overall increase in pedestrian congestion because sidewalks with lower base volumes can absorb greater increases in pedestrian travel before becoming congested. Among the Alternatives, Alternative 1 (No Project) would create the highest increases in pedestrian travel in the C-3 District and Alternative 4 would create the least. Alternative 5 would generate slightly less pedestrian travel than the Downtown Plan. Alternatives 2 and 3 would create slightly more pedestrian travel than the Plan would.

F. COMMUNITY SERVICES

Solid Waste

Table VII.F.1 shows C-3 District annual solid waste generation under the Downtown Plan and each Alternative in the year 2000. Development resulting from implementation of the Downtown Plan would generate less solid waste than would that resulting from any of the Alternatives, except Alternative 5. Development under the Downtown Plan would produce about seven percent less solid waste annually than would development under Alternative 1, the Alternative with the greatest solid waste generation. Alternatives 4 and 5 would also result in savings of about 6 1/2% to 7% of the solid waste generated under Alternative 1.

This seven percent savings, or about 6,000 tons of solid waste per year, would be greater than the annual solid waste generation of all Subarea 2 in the year 2000. It should be noted, however, that this reduction in projected solid waste generation would not affect or delay the City's need for new solid waste disposal methods and site(s) after 1988 (see Section IV.F. Community Services Setting and Impacts).

Police

The comparative effects on new criminal incidents between 1990 and 2000 of development under the Downtown Plan and the Alternatives are shown in Table VII.F.2. To put the changes shown in Table VII.F.2 into perspective, it should be noted that about 23,000 incidents (or about 20% of all City incidents) occurred in the C-3 District in 1982./1/ By 1990, this number will have risen to about 24,000 criminal incidents annually in the C-3 District (see Section IV.F. Community Services Setting and Impacts)./1/

Development under the Downtown Plan would generate fewer new incidents between 1990 and 2000 than would development under Alternatives 1, 2 and 3, but slightly more than development under Alternatives 4 and 5. Table VII.F.2 shows that in all cases, the crime rates in Subareas 5 and 6 (the Tenderloin and Union Square Subareas) dominate the crime statistics for the C-3 District as a whole. Because new development would be subject to more criminal incidents in these Subareas than elsewhere in the C-3 District (see Appendix K and Section IV.F.), the rate of new criminal incidents under each Alternative would be particularly sensitive to the amount of new development each would

TABLE VII.F.1: C-3 DISTRICT SOLID WASTE GENERATION BY SUBAREA AND ALTERNATIVE, 2000 (tons/year)

	Tons/Year (a)						% Change From 1990					
		Alternative						Alternative				
Subarea	DTP(b)	1	2	3	4	5	DTP(b)	1	2	3	4	5
1	44,530	48,070	47,350	45,980	45,420	44,720	8	16	14	11	10	8
2	5,190	5,670	5,660	5,120	4,500	4,720	32	44	44	30	14	20
3	8,560	8,740	8,670	8,730	8,200	8,160	8	10	9	10	3	3
4	3,790	3,890	3,850	4,020	3,620	3,690	7	10	8	13	2	4
5	10,260	10,880	10,850	10,870	10,190	10,250	10	16	16	16	9	10
6	15,180	16,190	16,100	15,890	15,540	15,350	5	12	11	10	7	6
7	7,510	7,840	7,830	7,720	7,630	7,550	1	5	5	3	2	1
TOTAL	95,020	101,280	100,310	98,330	95,100	94,440	8	15	14	12	8	7

(a) All numbers rounded to nearest 10 tons.

(b) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., and Golden Gate Disposal Company encourage in Subareas 5 and 6./2/ The Alternatives and the Downtown Plan fall into two distinct groups: 1) those which would encourage a high rate of growth in Subareas 5 and 6, and 2) those which would encourage a lower rate of growth in Subareas 5 and 6. Alternatives 1, 2 and 3 belong in the first category. Alternatives 4, 5 and the Downtown Plan, which would encourage about 40% less new development in Subareas 5 and 6, belong in the second category. Because of this difference, Alternatives 4, 5 and the Downtown Plan would all generate about 40% to 50% fewer new criminal incidents in the C-3 District as a whole than would Alternatives 1, 2 and 3.

The Downtown Plan, although generating a lower number of new incidents in Subareas 5 and 6 combined than would any of the Alternatives, would partially compensate for this advantage by generating comparatively higher numbers of new criminal incidents in

TABLE VII.F.2: PROJECTED CHANGES IN REPORTED CRIMINAL INCIDENTS PER YEAR IN THE C-3 DISTRICT, BY SUBAREA AND ALTERNATIVE, 1990-2000

		Alternative				
Subarea	DTP(a)	1	2	3	4	5
1	+92	+184	+175	+143	+135	+106
2	+164	+177	+177	+112	+57	+72
3	+45	+6	+15	+4	+35	+13
4	+8	+20	+21	+25	+11	+6
5	+230	+386	+376	+411	+192	+265
6	+241	+363	+355	+306	+282	+273
7	+3	+6	+18	+5	+26	+15
TOTAL	+783	+1,142	+1,137	+1,006	+738	+750

(a) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information from the San Francisco Police Department

Subareas 2 and 3 (the East South of Market and Central South of Market Subareas). In Subarea 2, the comparatively higher crime rate would be due to the Downtown Plan's comparatively greater total floor area in Subarea 2. Conversely, Subarea 1's comparatively lower crime rate would be due to the Downtown Plan's comparative discouragement of new floor area there. In Subarea 3, the comparatively high crime rate would be due to the Downtown Plan's greater encouragement of new housing. Housing in Subarea 3 is, and likely would continue to be, a target of a disproportionately high share of the Subarea's criminal incidents (see Appendix K).

The comparative effects of the Alternatives and the Downtown Plan on the demand for Police personnel and on the Police Department budget are shown in Tables VII.F.3 and VII.F.4. These effects would be roughly proportional to the projected changes in criminal incidents (see Table VII.F.2 and Appendix K).

TABLE VII.F.3: PROJECTED CHANGES IN DEMAND FOR POLICE DEPARTMENT PERSONNEL IN THE C-3 DISTRICT, BY ALTERNATIVE, 1990-2000

		Alternative				
Category (a)	DTP(b)	1	2	3	4	5
Field Operations	+8	+11	+11	+10	+7	+7
Investigation	+1	+2	+2	+2	+1	+1
Traffic	+0	+1	+1	+1	+1	+0
Support	+4	+6	+6	+6	+4	+4
TOTAL	+13	+20	+20	+19	+13	+12

(a) The categories listed contain the following Police Department Bureaus:

Field Operations:	Field Operations Bureau excluding the Traffic Division
Investigation:	Investigation Bureau
Traffic:	Traffic Division of the Field Operations Bureau
Support:	Support Services Bureau, 85 % of the Department's civilian jobs (these jobs may be filled by sworn personnel

(b) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information provided by the San Francisco Police Department

TABLE VII.F.4: PROJECTED CHANGES IN POLICE DEPARTMENT BUDGETS NECESSARY TO SERVE THE C-3 DISTRICT, BY ALTERNATIVE, 1990-2000

Budget Category (a)	Change in Department Annual Budget (1982 Dollars)					
		Alternative				
	DTP(b)	1	2	3	4	5
Labor	591,500	910,000	910,000	864,500	591,500	546,000
Expenses	31,200	48,000	48,000	45,600	31,200	28,800
Equipment	9,100	14,000	14,000	13,300	9,100	8,400
Programs	3,800	5,800	5,800	5,500	3,800	3,500
TOTAL	635,600	977,800	977,800	928,900	635,600	586,700

(a) The categories listed contain the following Police Department Budget categories:

Labor:	Total Labor Costs, including Police Salaries, Civilian Salaries and Fringe Benefits
Expenses:	Contractual Services, Current Expenses, Services of other Departments
Equipment:	Equipment and Supplies
Programs:	Special Programs, including Crime Prevention and Education, the Senior Escort Program and Community Relations Programs

(b) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information from the San Francisco Police Department

Fire

Table VII.F.5 shows the comparative effects of the Alternatives and the Downtown Plan on projected fire and non-fire incidents/3/ in the C-3 District. Development under the Downtown Plan and under Alternative 5 would generate lower numbers of new incidents than would any of the other Alternatives. None of the Alternatives would induce more than a two percent change in total annual incidents between 1990 and 2000, and none of the Alternatives (or the Downtown Plan) would differ by more than one percent (about

TABLE VII.F.5: PROJECTED ANNUAL FIRE AND NON-FIRE INCIDENTS IN THE C-3 DISTRICT, BY ALTERNATIVE, 2000

Annual Incidents in Year 2000	DTP	Alternative 1	2	3	4	5
Fire	1,295	1,297	1,300	1,297	1,300	1,295
Non-Fire	6,527	6,595	6,592	6,568	6,531	6,522
Total	7,822	7,892	7,892	7,865	7,831	7,817
Percent Change Between 1990 and 2000						
Fire	+0.4%	+0.5%	+0.8%	+0.5%	+0.8%	+0.4%
Non-Fire	+1.3%	+2.3%	+2.3%	+1.9%	+1.3%	+1.2%
Total	+1.1%	+2.0%	+2.0%	+1.7%	+1.2%	+1.1%

(a) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information from the San Francisco Fire Department.

75 annual incidents) in the number of C-3 District incidents they would generate. The effects of new construction in the C-3 District on fire and non-fire incidents would be very small, because of the effectiveness of the State and San Francisco Life Safety Code provisions (see Section IV.F.) for new high-rise structures. The number of annual fire incidents might actually decrease in some areas where older, small-scale buildings are replaced with new, fire-resistant larger-scale buildings.

Table VII.F.6 shows the resulting projected changes in annual service-hours for each type of task unit responding to the incidents shown in Table VII.F.5. Table VII.F.6 also shows the effects of adding all of the projected new service-hour demands to those units which currently spend the most time serving the C-3 District. This is a worst-case assumption, since it is likely that the new service-hour demands would be spread among all units responding to calls in the C-3 District (see Appendix K). Like the changes in incidents shown in Table VII.F.5, very little change would occur in service-hour demands between 1990 and 2000 (no more than two percent), and very little difference (less than one percent) would occur among the Alternatives and the Downtown Plan in the year 2000.

TABLE VII.F.6: PROJECTED ANNUAL FIRE DEPARTMENT SERVICE-HOUR DEMANDS IN THE C-3 DISTRICT, BY ALTERNATIVE, 1990-2000

Increase in C-3 District Service-Hour Demands 1990-2000

Task Unit Category	DTP(a)	Alternative 1	2	3	4	5
Division	1	3	3	2	2	1
Battalion	4	6	7	5	5	3
Engine Co.	12	20	18	17	14	11
Truck Co.	6	11	10	9	8	6
Rescue Co.	3	6	4	5	4	3

Total Service Hours(b) in Year 2000, By Unit, If All New C-3 District Demands Were Met By Nearest Units

Units Nearest to C-3 District	DTP	Alternative 1	2	3	4	5
Division 1	284	285	286	285	285	284
Battalion 3	302	305	305	304	303	302
Engine Co. 1	568	577	575	574	571	568
Truck Co. 1	441	446	444	444	442	441
Rescue Co. 1	509	511	510	510	509	509

(a) DTP: Downtown Plan
(b) Rounded to the nearest hour; totals do not add up exactly, due to rounding.

SOURCE: Environmental Science Associates, Inc., based on information provided by the San Francisco Fire Department

The Fire Department would need no additional equipment or personnel to serve the projected demands generated by new C-3 District development under the Downtown Plan or any of the Alternatives./4,5/ As noted in Section IV.F, however, all of the units shown in Table VII.F.6 are among the busiest units in the City, and would experience incremental increases in an already heavy workload.

The projected growth in building space between 1984 and 2000 would require the Fire Department to hire additional building inspectors, in order to maintain annual inspections of all Downtown high-rises. The Department currently has 32 inspectors./6/ Table VII.F.7 shows the numbers of additional inspectors that would be required under the Downtown Plan and the Alternatives, and the corresponding costs to the Department. The costs shown are labor costs (salaries plus fringe benefits) only. The Fire Department has indicated that no new equipment or administrative personnel would be required to support the additional inspectors./5/

TABLE VII.F.7: PROJECTED ANNUAL FIRE INSPECTION SERVICE IN THE C-3 DISTRICT, BY ALTERNATIVE, 1984-1990 AND 1990-2000

		1990 - 2000					
			Alternative				
	1984 - 1990	DTP	1	2	3	4	5
Additional Personnel (a)	2	0	1	1	0	0	0
Additional Costs (1981 - 82 Dollars)	$118,930	$0	$59,470	$59,470	$0	$0	$0

(a) These calculations are based on Gruen Gruen + Associates, March 1981, Fiscal Impacts of New Downtown High-Rises, which found that each inspector serviced an average of about 16 million sq. ft. of building space. The report assumed that, to reasonably maintain current service levels, the first additional inspector would be hired when an additional 50% of the average amount of space assigned per inspector was constructed, and each inspector thereafter would be hired when additional space was constructed which exceeded the average workload by 10%.

(b) DTP: Downtown Plan

SOURCE: Environmental Science Associates, Inc., based on information from Gruen Gruen + Associates and the San Francisco Fire Department.

NOTES - Community Services

/1/ This estimate may be correct only to about the nearest 1,000 incidents, because Reporting Area boundaries and C-3 District boundaries do not coincide.

/2/ Projected changes in incidents shown in Table VII.F.2 are based on crime rates for existing land uses in the existing subareas, and therefore do not take into accounty any potential change in the "character" of a neighborhood. For example, should future development in Subareas 5 and 6 cause the indirect displacement of people likely to be involved in criminal incidents, then the actual crime rates in those areas would likely be less than those shown in Table VII.F.2. This effect was conterbalanced to some extent by applying the crime rates of new buildings to growing land uses, and the crime rates of old buildings to declining land uses, wherever possible. Thus, it was assumed that any new buildings in the future would have security systems similar to those in today's new buildings, and that buildings to be demolished would have crime rates similar to those of today's old buildings.

NOTES - Community Services (Continued)

/3/ Non-fire incidents include: false alarms; rescue calls (resuscitation, first aid, person(s) trapped in elevators or autos, landslides, aircraft incidents and drownings); overpressure calls (steam pipe ruptures, gas pipe ruptures, water heater ruptures); hazard calls (gas/oil spillage, explosives removal, downed power lines, electric short circuits, natural gas leaks, building collapses); service calls (lock out/lock in, water removal, animal rescue, assist police, broken hydrants, sinking boats, broken sprinklers); and other miscellaneous incidents.

/4/ This analysis does not consider the effects of any growth outside of the C-3 District. Many of the units which serve the C-3 District also serve portions of the South-of-Market area, south of Folsom Street. Future growth in this area, combined with that projected for the C-3 District, could require new service (most likely an Engine Company) as C-3 District units become busier.

/5/ Robert Rose, Deputy Chief, Support Services, San Francisco Fire Department, memorandum dated March 25, 1983.

/6/ In fiscal year 1981-82, based on San Francisco Fire Department, July 24, 1982, 1981-82 Annual Report. No additional inspectors would be needed between 1981 and 1984.

G. ENERGY RESOURCES AND UTILITIES

The energy requirements of future development in the downtown would increase the need for development of natural resources such as geothermal steam, oil, natural gas, and hydroelectric sites. The energy requirements of future development in the downtown would also contribute to heat island effects in the downtown. Energy resources and utilities mitigation measures described on pp. V.G.1-V.G.5 of this report could be applied to the Downtown Plan or any of the Alternatives and would, if implemented, result in a reduction in the electricity requirements and, to a lesser extent, in the natural gas requirements of future downtown development. This reduction would, in turn, reduce physical energy-related impacts on the downtown such as increased air temperatures and stagnant air. It would also decrease the demand for non-renewable energy resources.

Energy requirements of commercial development are approximately proportional to floor area, for major categories of use, given consistent assumptions about building design, location, and operation. Energy requirements of residential development, conversely, are approximately proportional to the number of units, for each type of residential unit, given consistent assumptions on family size, location, and appliances. Because the residential development estimated to occur in the downtown during the 1984-1990 period is small compared to the commercial development estimated to occur (about 10%), the overall impact on energy resources of development occurring under the Downtown Plan or its Alternatives can be roughly ranked by their relative increase in commercial floor area. Using this ranking criterion, Alternative 1 would have the greatest impact on energy resources and utilities and Alternative 4 would have the least impact. At the level of precision employed in this analysis, the impacts of Alternatives 1, 2, and 3 are essentially the same, as are the impacts of the Downtown Plan and Alternatives 4 and 5 (see Table VII.G.1). The following comparison of the impacts of the various Alternatives to those of the Downtown Plan is organized to reflect this similarity.

DOWNTOWN PLAN

Development under the Downtown Plan would increase building electricity consumption by about 350 kWh per year (about 15%) for an annual requirement of about 2.6 billion kWh between 1984 and 2000. Peak electricity demand would increase from 560 to 665 MW between 1984 and 2000 for about a 19% increase. Natural gas consumption would rise

TABLE VII.G.1: DOWNTOWN-RELATED ENERGY IMPACTS, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5

		1990		2000											
				Impacts						% Change From 1984					
					Alternatives						Alternatives				
	1984	Impact	% Change	DTP	1	2	3	4	5	DTP	1	2	3	4	5
Building Energy															
Electricity Consumption (billion kWh/yr)	2.3	2.5	9	2.6	2.8	2.8	2.7	2.7	2.6	13	22	22	17	17	13
Peak Electric Demand (megawatts)	560	615	10	665	705	700	685	665	660	19	26	25	22	19	18
Natural Gas Consumption (billion cu. ft./yr)	5.1	5.4	6	5.6	5.8	5.9	5.7	5.9	5.7	10	14	16	12	16	12
Total Energy (trillion Btu/yr)	29	31	7	33	35	36	34	35	33	14	21	24	17	21	14
Transportation Energy															
Average Energy/Trip (thousand Btu/ passenger-mile)	2.9	2.6	-10	2.5	2.5	2.5	2.5	2.5	2.5	-14	-14	-14	-14	-14	-14
Total Energy (trillion Btu/yr)	9.1	9.2	1	10.1	10.8	10.8	10.8	10.1	10.1	11	19	19	19	11	11
Total Energy Consumption (trillion Btu/yr)	38	40	5	43	46	47	45	45	43	13	21	24	18	18	13
Cost of Energy to Customer (millions of 1983 dollars)	290	340	17	430	450	450	440	440	430	48	55	55	52	52	48

SOURCE: Environmental Science Associates, Inc.

about 10% during this period for a total of about 5.6 billion cu. ft. per year, and transportation energy use would increase by about 11% for a total of about 10.1 trillion Btu per year. Overall energy consumption would increase approximately 13% to about 43 trillion Btu/year. The cost to the consumer of energy required for downtown development would increase from about $290 million per year in 1984 to about $430 million per year in 2000 (all in 1983 dollars).

Changes in the modal split of travel between the downtown and outlying areas by the year 2000 and increased fuel efficiency of automobiles would reduce average energy consumption per passenger-mile traveled by about 14%, but increased passenger-miles traveled would increase overall energy requirements for downtown-related travel by about 11%.

COMPARISON OF ALTERNATIVES WITH THE DOWNTOWN PLAN

Alternatives 1, 2, and 3

Development estimated to occur between 1984 and 2000 under the Alternatives would result in an annual requirement for about 2.7 to 2.8 billion kWh of electricity and about 5.7 to 5.9 billion cu. ft. of natural gas./1/ Building electricity consumption would increase by about 430 to 490 kWh per year from 1984 levels compared to an increase of about 350 million kWh per year for development under the Downtown Plan. The peak electricity demand under the Alternatives would be about 685 to 705 MW, compared to about 665 MW under the Plan. Natural gas consumption would increase by about 630 to 790 million cu. ft. per year from 1984 levels under these Alternatives compared to an increase of about 530 million cu. ft. per year under the Plan. This would be about four to eight percent more electricity and about two to five percent more natural gas than required annually for development under the Plan.

Transportation energy requirements for development under these Alternatives would be about 107% of those estimated for the Downtown Plan./1/ These Alternatives would result in consumption of about 42 million gallons of gasoline annually for automobile travel, compared to about 40 million gallons per year under the Plan. About 340 million kWh of electricity would be required annually for BART and Muni travel to and from the downtown, compared to about 320 million kWh per year under the Plan. About nine million gallons per year of diesel fuel would be required for CalTrains and regional bus transportation, compared to about eight million gallons per year under the Plan.

Development under these Alternatives would result in about 4.4 billion passenger-miles per year at a thermal energy cost of about 10.8 trillion Btu, or about 2,500 Btu per passenger-mile; development under the Plan would result in about 4.1 billion passenger-miles per year at a thermal energy cost of about 10.1 trillion Btu, or about 2,500 Btu per passenger-mile. Thus, the Plan would result in about the same energy per average trip and about seven percent fewer passenger-miles traveled per year, for an overall reduction in energy consumption of about six percent compared to these Alternatives.

All of these Alternatives would result in consumption of more energy in 2000 than would the Downtown Plan. Thus, any of these Alternatives would result in greater city-wide and regional energy consumption than the project.

Alternatives 4 and 5

Development projected to occur between 1984 and 2000 under these Alternatives would result in an annual requirement for about 2.6 to 2.7 billion kWh of electricity and about 5.7 to 5.9 billion cu. ft. of natural gas. Building consumption of electricity would increase by about 350 to 360 million kWh per year from 1984 levels, compared to an increase of about 350 million kWh per year for development under the Plan. Peak electricity demand would be about 660 to 665 MW compared to about 665 MW under the Plan. Natural gas consumption would increase by about 580 - 810 million cu. ft. per year from 1984 levels under these Alternatives compared to an increase of about 530 million cu. ft. per year under the Plan. The building energy requirements of these Alternatives would be more than those of the Plan because Alternatives 4 and 5 would have more climate-controlled space, than would the Downtown Plan. Transportation energy requirements for these Alternatives would be the same as under the Plan. Overall, the energy impacts of these Alternatives would not differ substantially from those projected for the Plan, at this general level of analysis (see Table VII.G.1).

The overall impact of Alternatives 4 and 5 on city-wide and regional energy consumption would be about the same as the impacts described for the Downtown Plan.

H. ARCHITECTURAL/HISTORIC RESOURCES AND URBAN DESIGN

Architectural Resources

A comparison of rated architectural resources susceptible to demolition or substantial alteration under the Downtown Plan and the five Alternatives (see Tables VII.H.1 and VII.H.2) indicates that the Downtown Plan is more effective than any of the Alternatives in protecting these resources. Under the Downtown Plan, approximately three percent of the Heritage A, B and C resources remaining in 1990 would be demolished or substantially altered by the year 2000, compared to five percent under Alternative 4, six percent under Alternative 5, eight percent under Alternative 2, and nine percent under Alternatives 1 and 3. Under the Downtown Plan, no National Register and/or City landmarks are forecast to be lost. Tables VII.H.1 and VII.H.2 present comparisons by resource type of resources forecast to become vulnerable to demolition in the C-3 district, by Alternative and subarea.

Streetscape and Pedestrian Amenities

Like the streetscape analysis of the Downtown Plan, (see Section IV.H), the streetscape analysis for the Alternatives uses projections for the quantity of development forecast for the C-3 District. The forecasts are presented in the Downtown EIR Consultant's Report, Section V.B, which is elsewhere incorporated by reference into this EIR.

The streetscape analysis includes cross-section views along Sansome and Ecker Streets as they could appear in the year 2000 under the provisions of each Alternative (see Figures VII.8 through VII.12, pp. VII.H.4-VII.H.8). The reasons for selecting the particular cross-section shown in the views are described in Note 10, p. IV.H.47. See Figure IV.H.10, p. IV.H.32 for comparisons with the companion effects of the Downtown Plan.

As in the impact analysis of the Downtown Plan, the principal assumption underlying the design of each building shown in the cross-sections to be built between 1990 and 2000 is that each developer would build the maximum square footage that would be economically feasible, on the fewest number of floors that would permit that floor area to be reached. For the purposes of the 1990-2000 Alternatives analysis, existing buildings are assumed to be demolished on the case-study sites of opportunity for each Alternative, and new buildings constructed in their place, where this would be permitted under the provisions of the Alternative. (Text continues on p. VII.H.9.)

TABLE VII.H.1: COMPARISON OF C-3 DISTRICT ARCHITECTURAL RESOURCES SUSCEPTIBLE TO DEMOLITION OR SUBSTANTIAL ALTERATION UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5, 1984-1990 AND 1991-2000

Study Area and Type of Resource (a)	Total Resources in 1984	Total Demolitions and Alterations Proposed by 1990	Total Resources Forecast to Become Vulnerable, 1990-2000(c)					
			Downtown Plan	Alternatives				
				1	2	3	4	5
Subarea 1								
Heritage A	47	0	0	5	4	4	2	3
Heritage B	84	10	1	20	19	18	14	16
Subtotal A + B (b)	131	10	1	25	23	22	16	19
Heritage C	188	33	14	39	37	38	28	34
Total A + B + C	319	43	15	64	60	60	44	53
National Register and/or City Landmarks (b)	17	1	0	5	3	3	2	2
Subareas 2-7								
Heritage A	83	0	0	5	5	4	3	4
Heritage B	212	2	8	13	11	11	5	6
Subtotal A + B (b)	295	2	8	18	16	15	8	10
Heritage C	775	5	18	34	31	40	10	11
Total A + B + C	1,070	7	26	52	47	55	18	21
National Register and/or City Landmarks (b)	14	0	0	2	2	2	1	2
C-3 Totals								
Heritage A	130	0	0	10	9	8	5	7
Heritage B	296	12	9	33	30	29	19	22
Subtotal A + B (b)	426	12	9	43	39	37	24	29
Heritage C	963	38	32	73	68	78	38	45
Total A + B + C	1,389	50	41	116	107	115	62	74
National Register and/or City Landmarks (b)	31	1	0	7	5	5	3	4

(a) See Appendix E for descriptions of ratings in this column.

(b) Totals for Heritage A and Heritage B buildings include National Register and/or City Landmark properties. The V.C. Morris Building is a National Register property, but is not rated by Heritage because it was completed after 1945. It is not included in the corresponding totals shown in this table.

(c) Projection assumes required conditional use permits in conservation districts would be approved.

SOURCE: Roger Owen Boyer & Associates.

TABLE VII.H.2: COMPARISON OF PERCENTAGES OF C-3 DISTRICT ARCHITECTURAL RESOURCES SUSCEPTIBLE TO DEMOLITION OR SUBSTANTIAL ALTERATION UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5, 1984-1990 AND 1991-2000

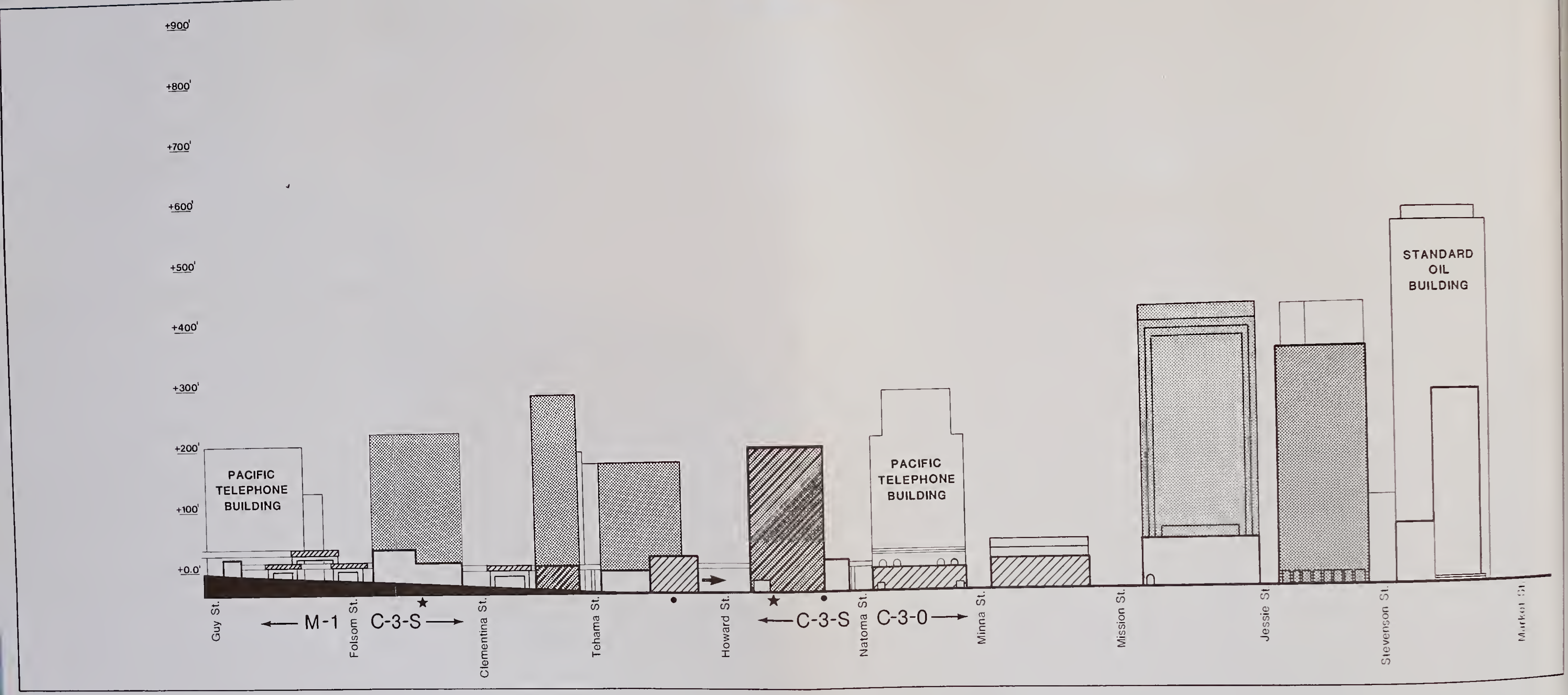
Study Area and Type of Resource (a)	Total Resources in 1984	% 1984 Total Proposed to be Demolished or Altered by 1990	% 1990 Resources Forecast to Become Vulnerable, 1990-2000 (c)					
			Downtown Plan	Alternatives				
				1	2	3	4	5
Subarea 1								
Heritage A	47	0	0	11	9	9	4	6
Heritage B	84	12	1	27	26	24	19	22
Subtotal A + B (b)	131	8	1	20	19	18	13	16
Heritage C	188	18	9	25	24	25	18	22
Total A + B + C	319	14	5	23	22	22	16	19
National Register and/or City Landmarks (b)	17	6	0	31	18	18	13	13
Subareas 2-7								
Heritage A	83	0	0	6	6	5	4	5
Heritage B	212	1	4	6	5	5	2	3
Subtotal A + B (b)	297	1	3	6	5	5	3	3
Heritage C	775	1	2	4	4	5	1	1
Total A + B + C	1,070	1	2	5	4	5	2	2
National Register and/or City Landmarks (b)	14	0	0	14	14	14	7	14
C-3 Totals								
Heritage A	130	0	0	8	7	6	4	5
Heritage B	296	4	3	12	11	10	7	8
Subtotal A + B (b)	426	3	2	10	9	9	6	7
Heritage C	963	4	3	8	7	8	4	5
Total A + B + C	1,389	4	3	9	8	9	5	6
National Register and/or City Landmarks (b)	31	4	0	23	17	16	10	13

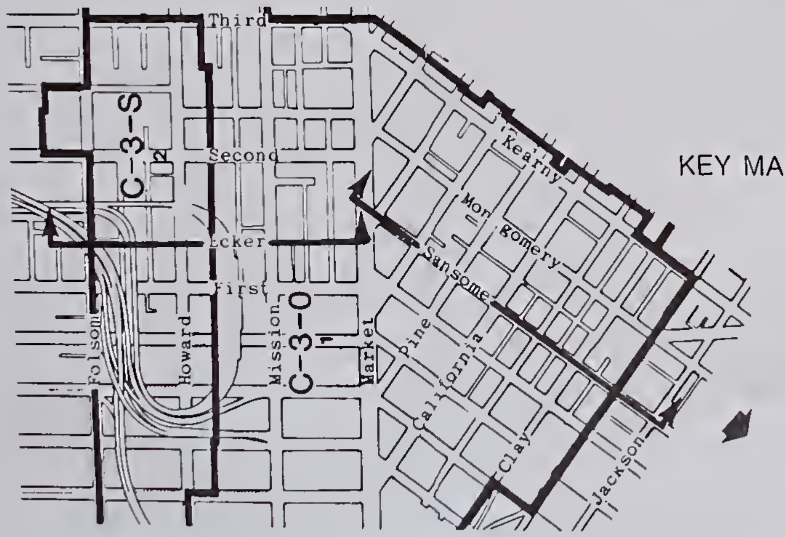
(a) See Appendix E for descriptions of ratings in this column.

(b) Totals for Heritage A and Heritage B buildings include National Register and/or City Landmark properties. The V.C. Morris Building is a National Register property, but is not rated by Heritage because it was completed after 1945. It is not included in the corresponding totals shown in this table.

(c) Projection assumes required conditional use permits in conservation districts would be approved.

SOURCE: Roger Owen Boyer & Associates.





ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

▨ BUILDING IN SECTION

☐ BUILDING AT STREET FRONTAGE

☐ BUILDING AT DEPTH OF UP TO ONE BLOCK

☐ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

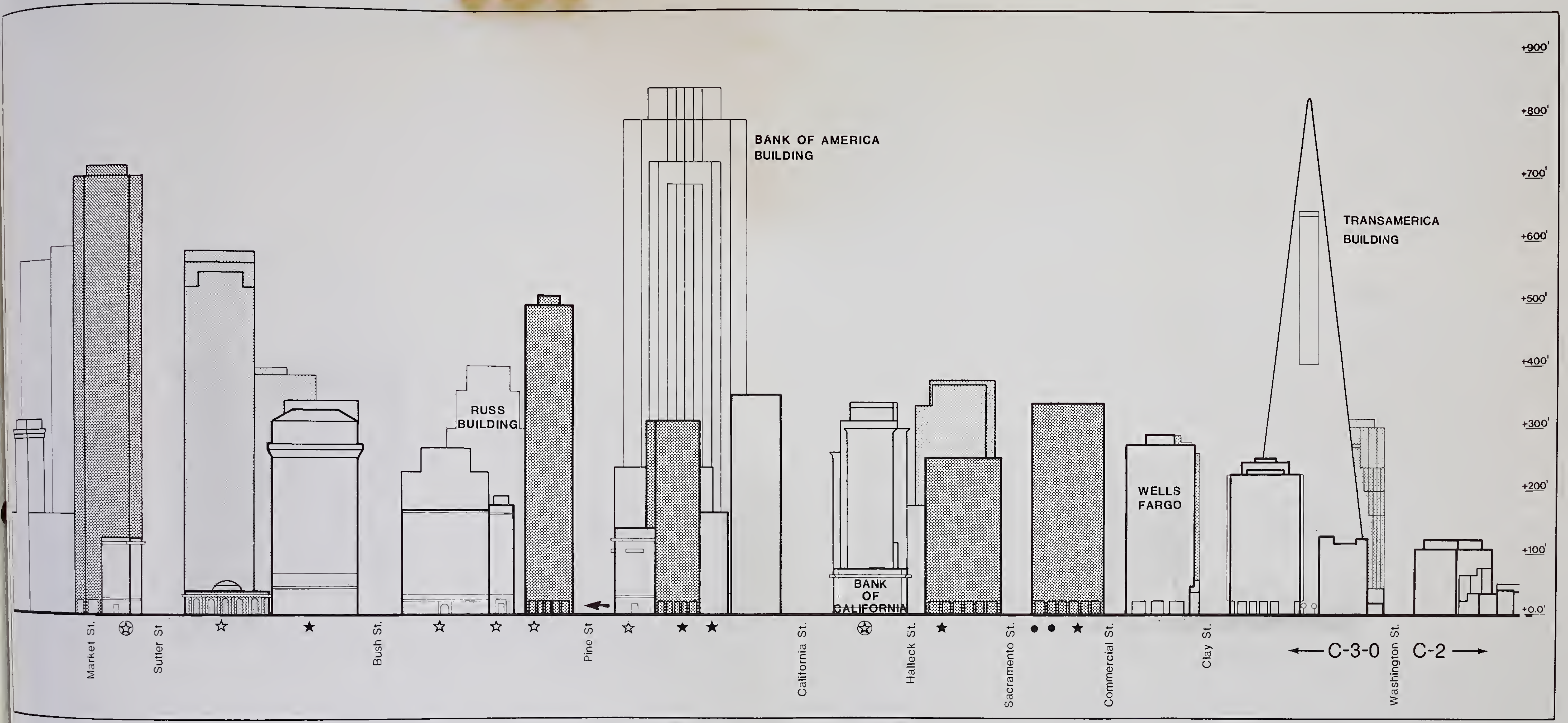
ARCHITECTURAL RESOURCES

⊛ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

● HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

☐ BEFORE 1983

☐ 1983-1984

▒ 1985-1990

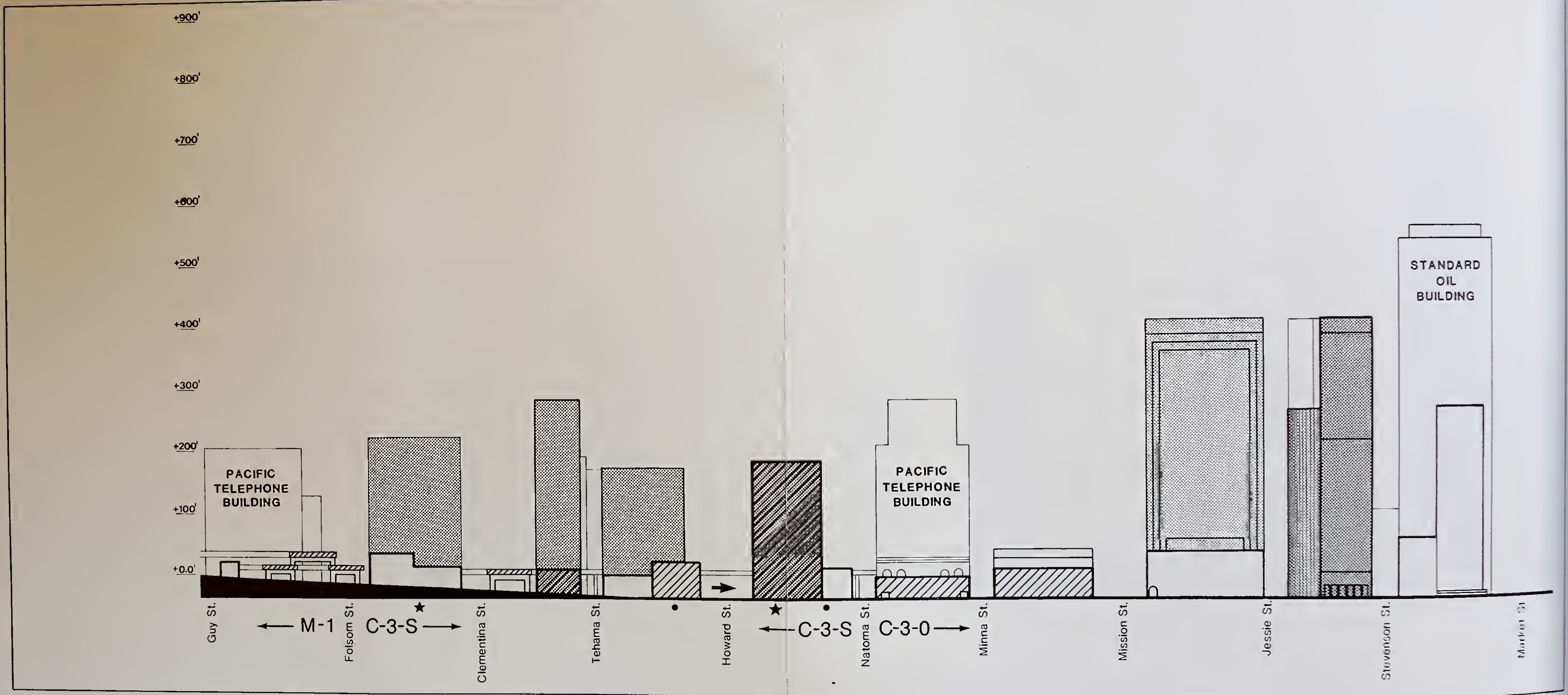
▨ 1991-2000

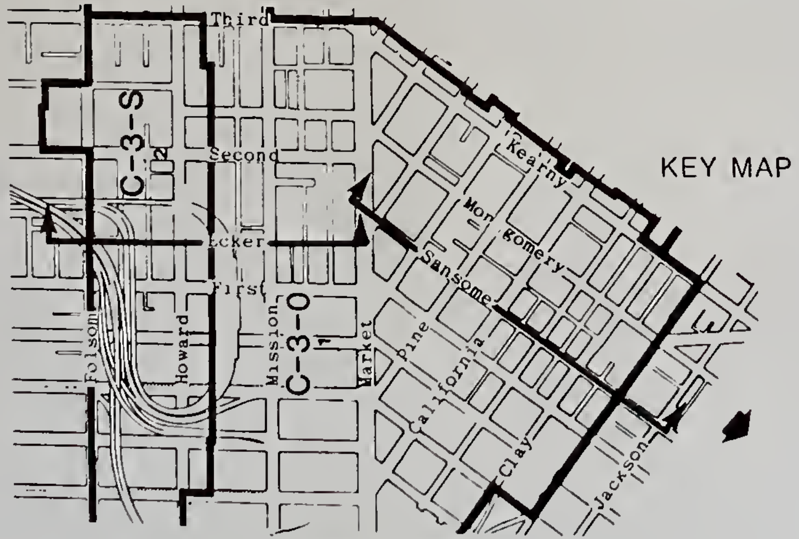
PHOTO LOCATIONS

➡ LOCATION OF STREET-LEVEL PHOTO
(See Figures VII.13 and VII.14)

FIGURE VII.8:
C-3 DISTRICT STREETSCAPE,
ALTERNATIVE 1, 2000

SOURCE: Roger Owen Boyer and Associates





ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

▨ BUILDING IN SECTION

☐ BUILDING AT STREET FRONTAGE

☐ BUILDING AT DEPTH OF UP TO ONE BLOCK

☐ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

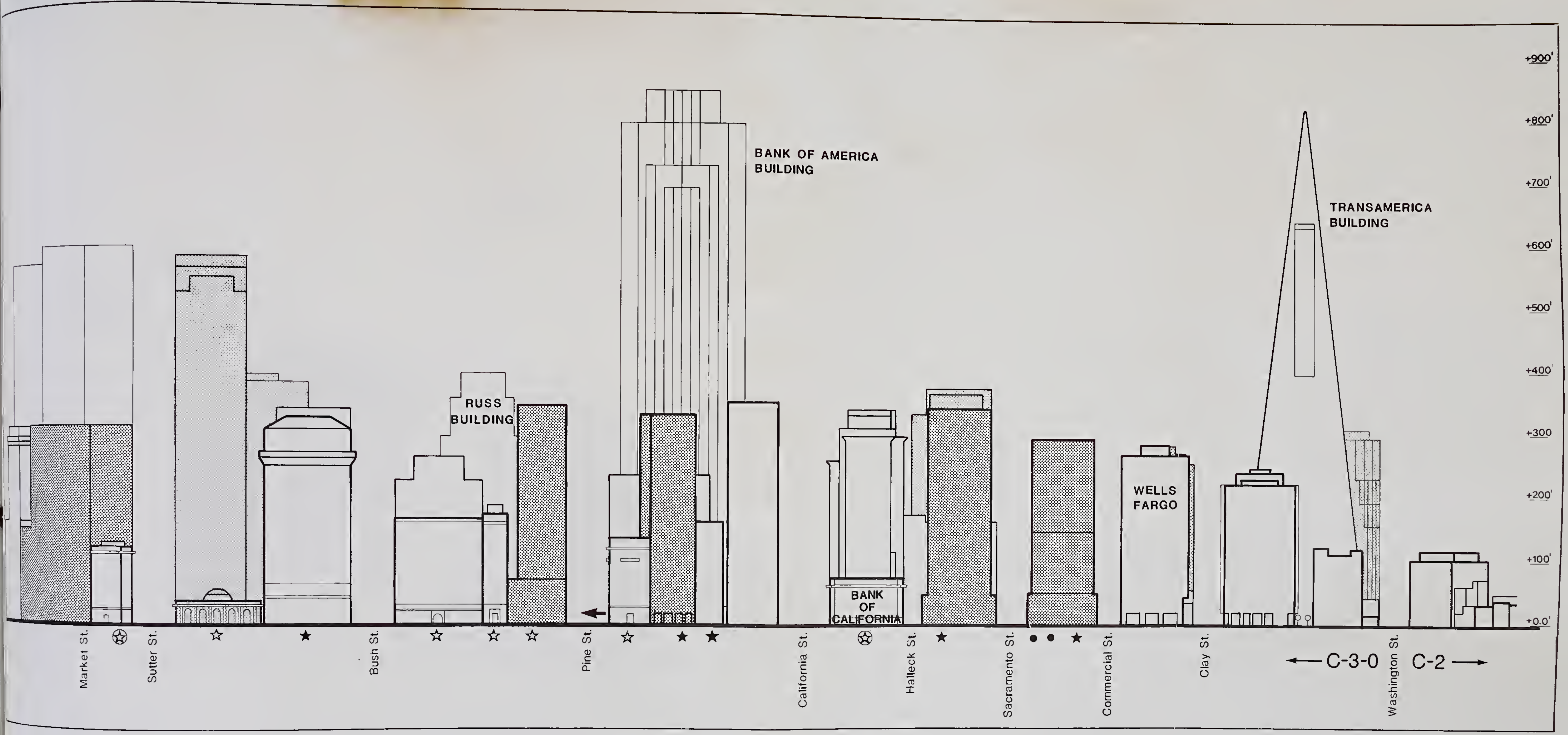
ARCHITECTURAL RESOURCES

✪ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

• HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

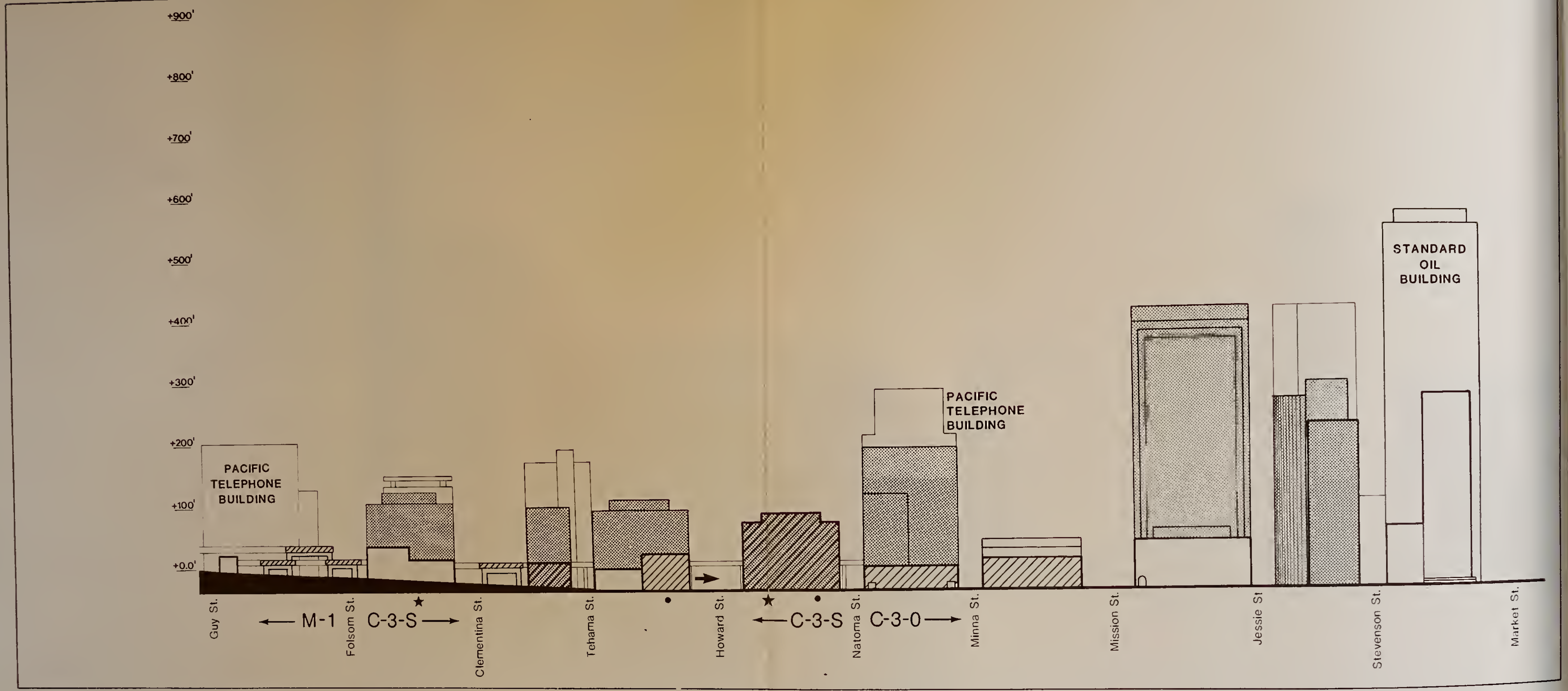
☐	BEFORE 1983
☐	1983-1984
▨	1985-1990
▨	1991-2000

PHOTO LOCATIONS

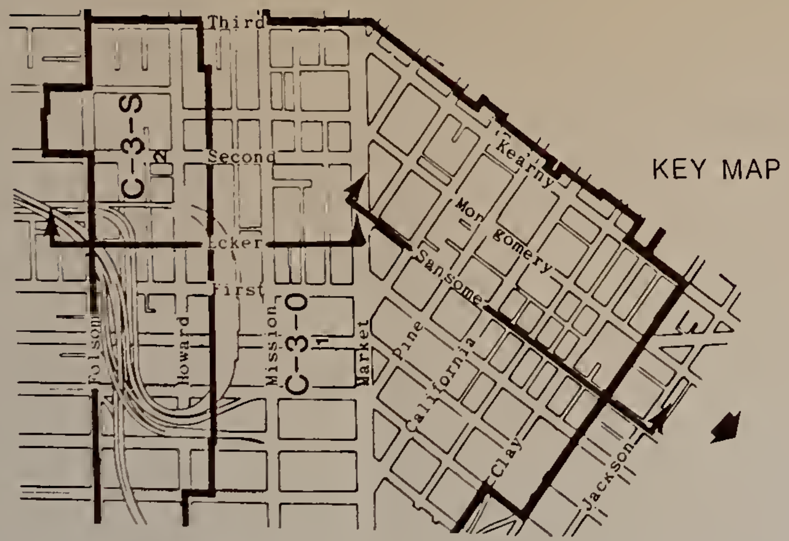
➡ LOCATION OF STREET-LEVEL PHOTO (See Figures VII.15 and VII.16)

FIGURE VII.9:
C-3 DISTRICT STREETSCAPE, ALTERNATIVE 2, 2000

SOURCE: Roger Owen Boyer and Associates



ECKER STREET SECTION (Looking Southwest)



DEPTH OF IMAGE

▨ BUILDING IN SECTION

☐ BUILDING AT STREET FRONTAGE

☐ BUILDING AT DEPTH OF UP TO ONE BLOCK

☐ BUILDING AT DEPTH OF MORE THAN ONE BLOCK

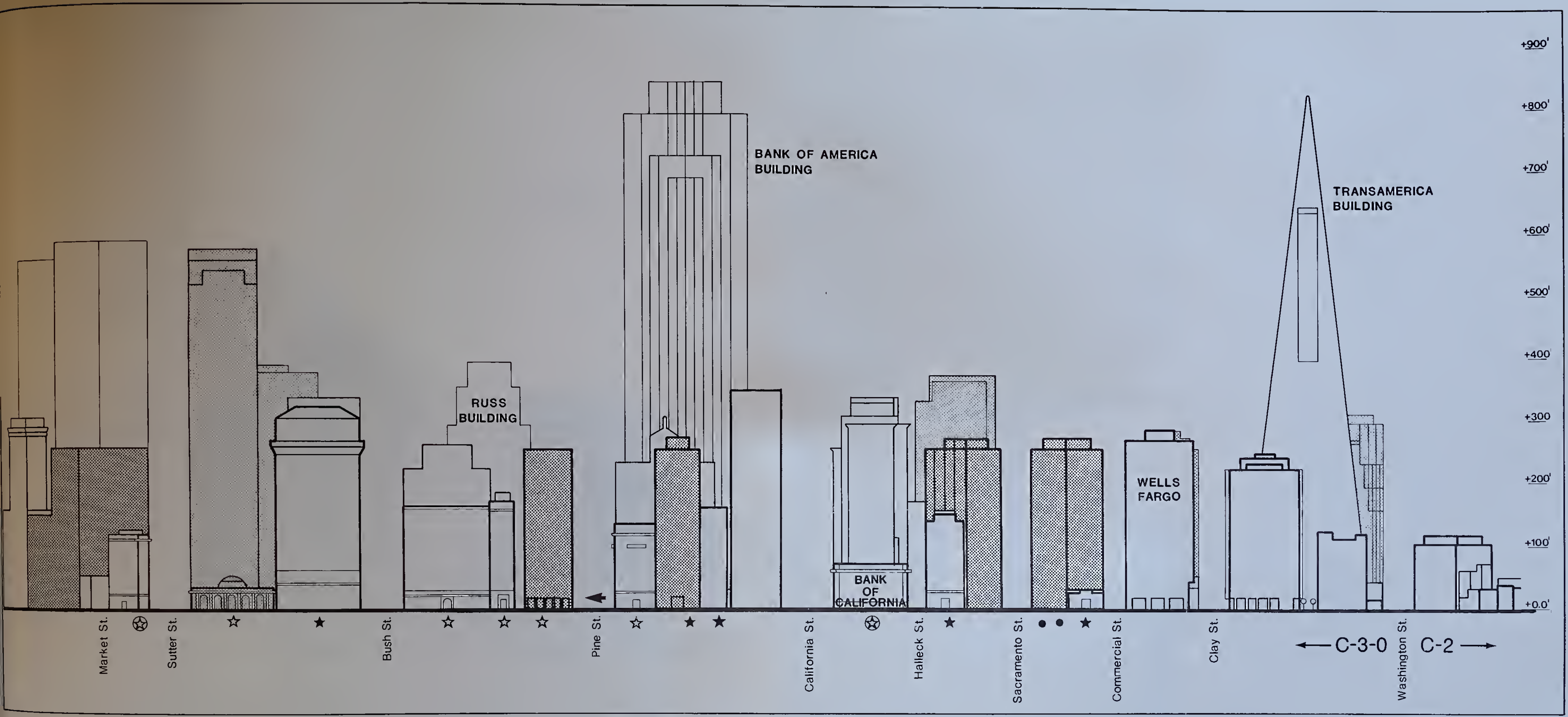
ARCHITECTURAL RESOURCES

✪ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

● HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

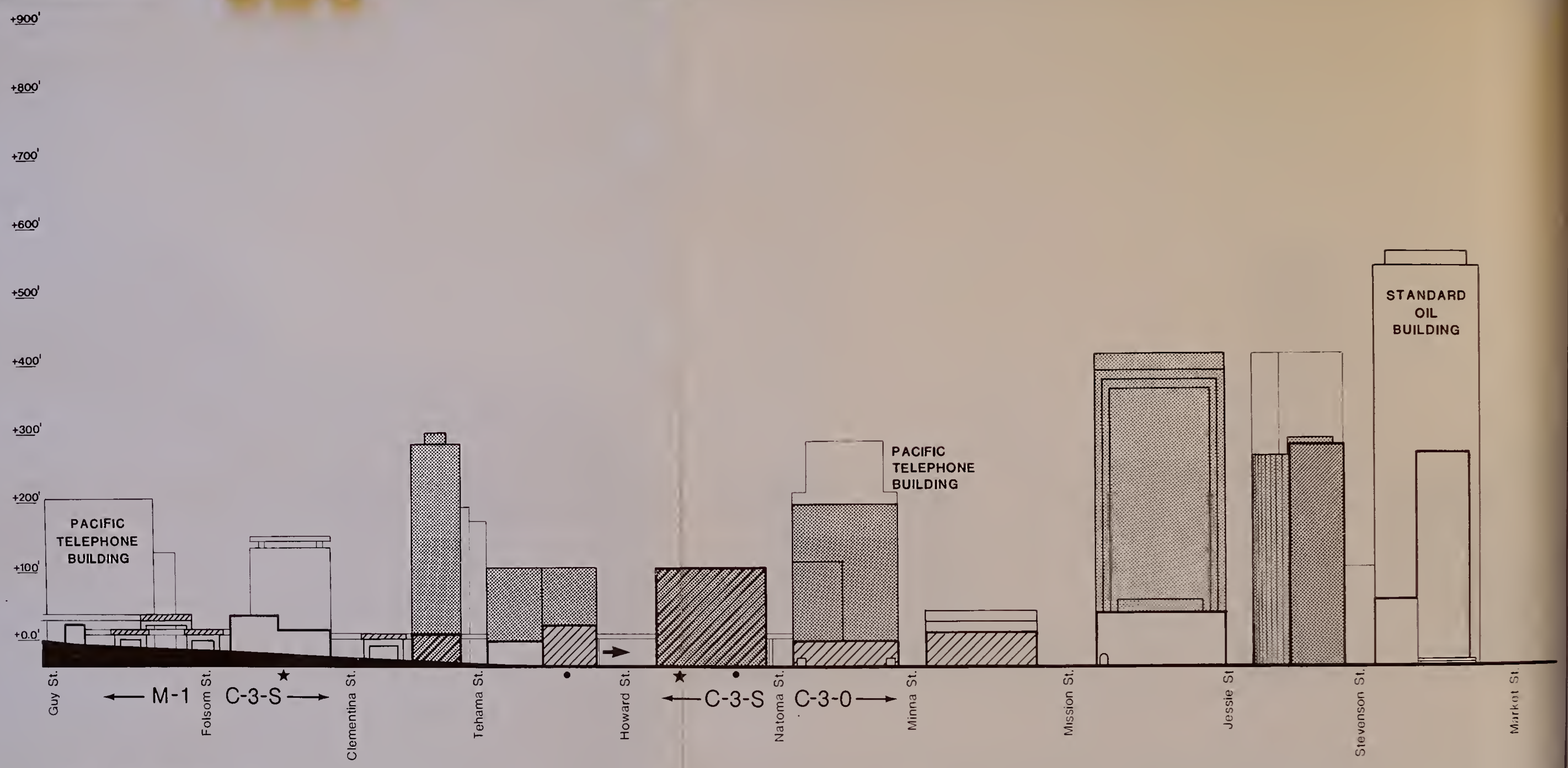
- ☐ BEFORE 1983
- ▨ 1983-1984
- ▨ 1985-1990
- ▨ 1991-2000

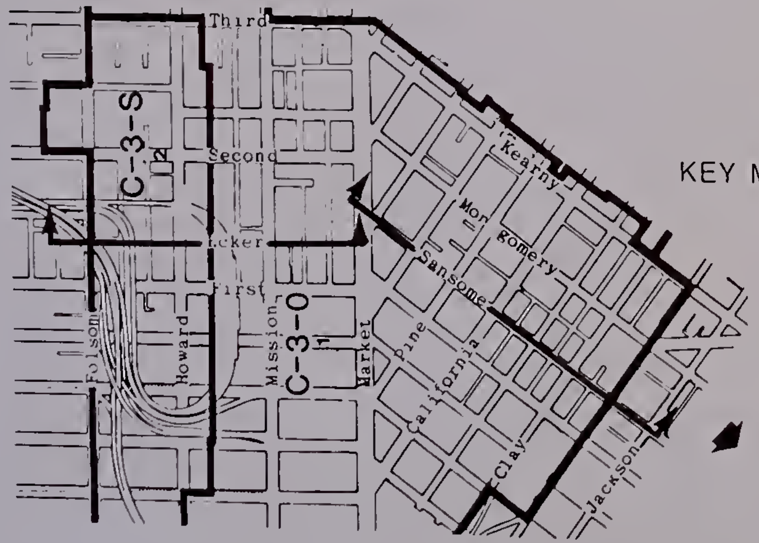
PHOTO LOCATIONS

➡ LOCATION OF STREET-LEVEL PHOTO
(See Figures VII.16 and VII.17)

FIGURE VII.10:
C-3 DISTRICT STREETSCAPE, ALTERNATIVE 3, 2000

SOURCE: Roger Owen Boyer and Associates





KEY MAP

ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE

▨ BUILDING IN SECTION

☐ BUILDING AT STREET FRONTAGE

☐ BUILDING AT DEPTH OF UP TO ONE BLOCK

BUILDING AT DEPTH OF MORE THAN ONE BLOCK

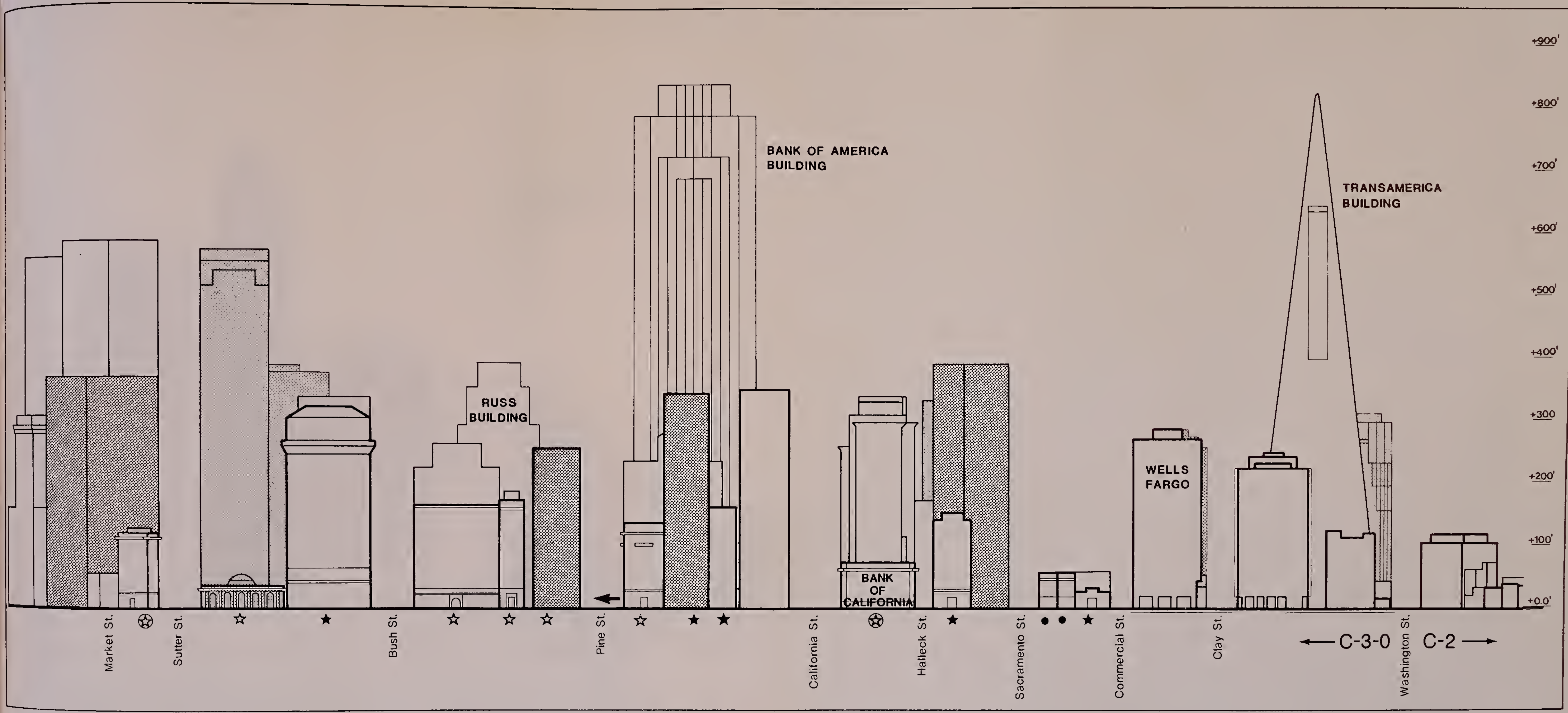
ARCHITECTURAL RESOURCES

⊛ CITY LANDMARK

☆ HERITAGE A

★ HERITAGE B

• HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

☐ BEFORE 1983

☐ 1983-1984

▨ 1985-1990

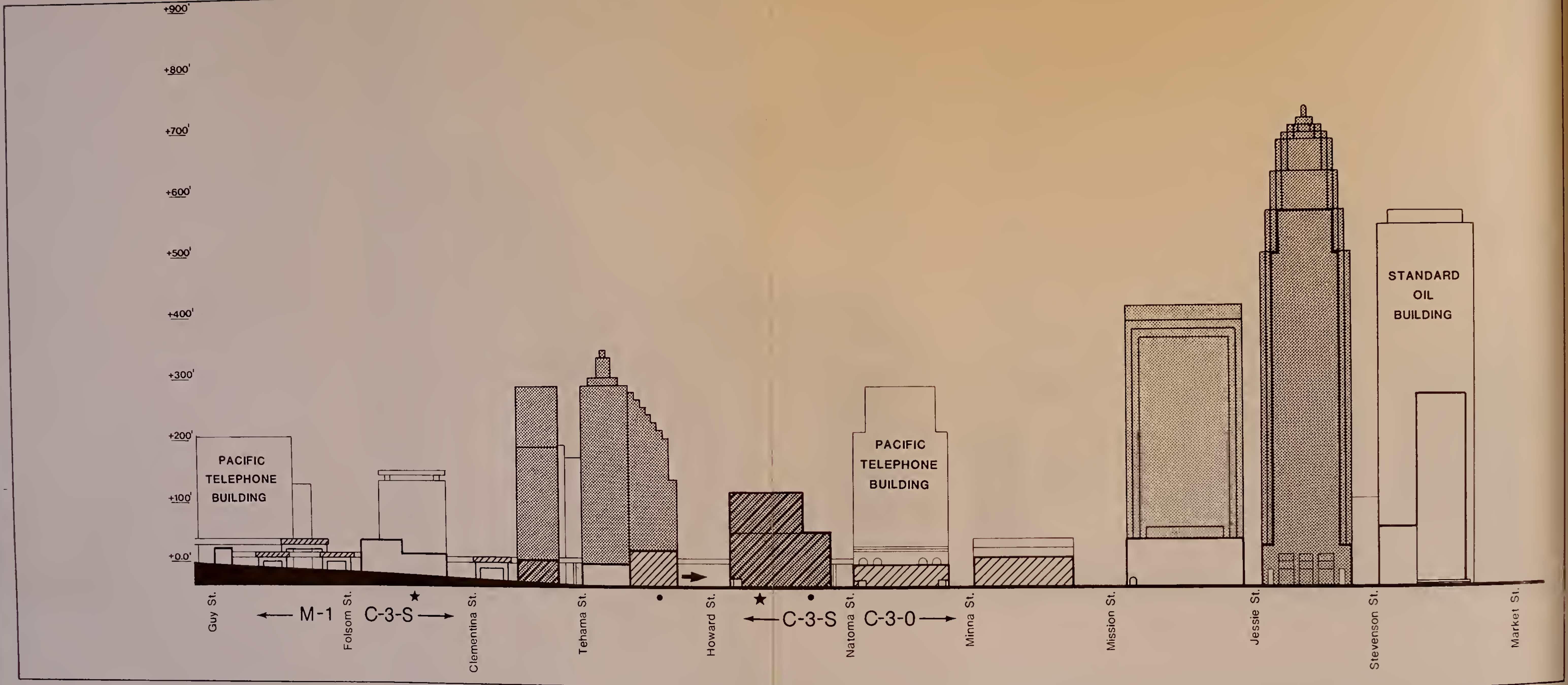
▨ 1991-2000

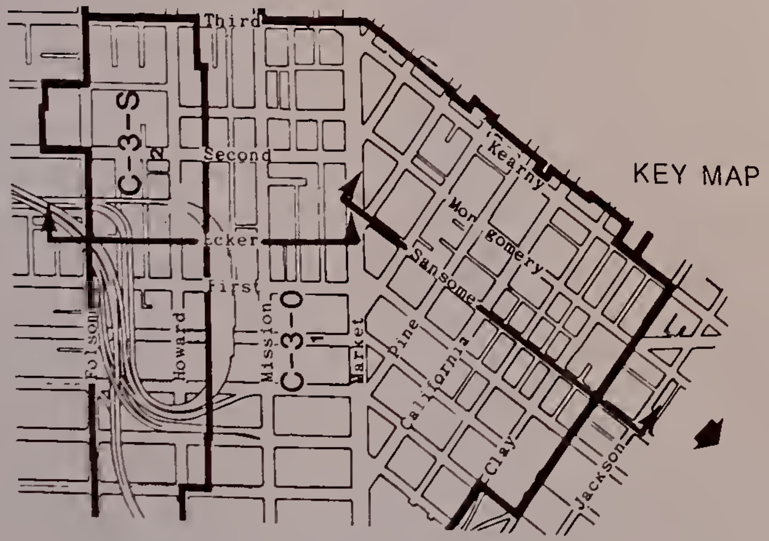
PHOTO LOCATIONS

➔ LOCATION OF STREET-LEVEL PHOTO
(See Figures VII.16 and VII.18)

FIGURE VII.11:
C-3 DISTRICT STREETSCAPE,
ALTERNATIVE 4, 2000

SOURCE: Roger Owen Boyer and Associates



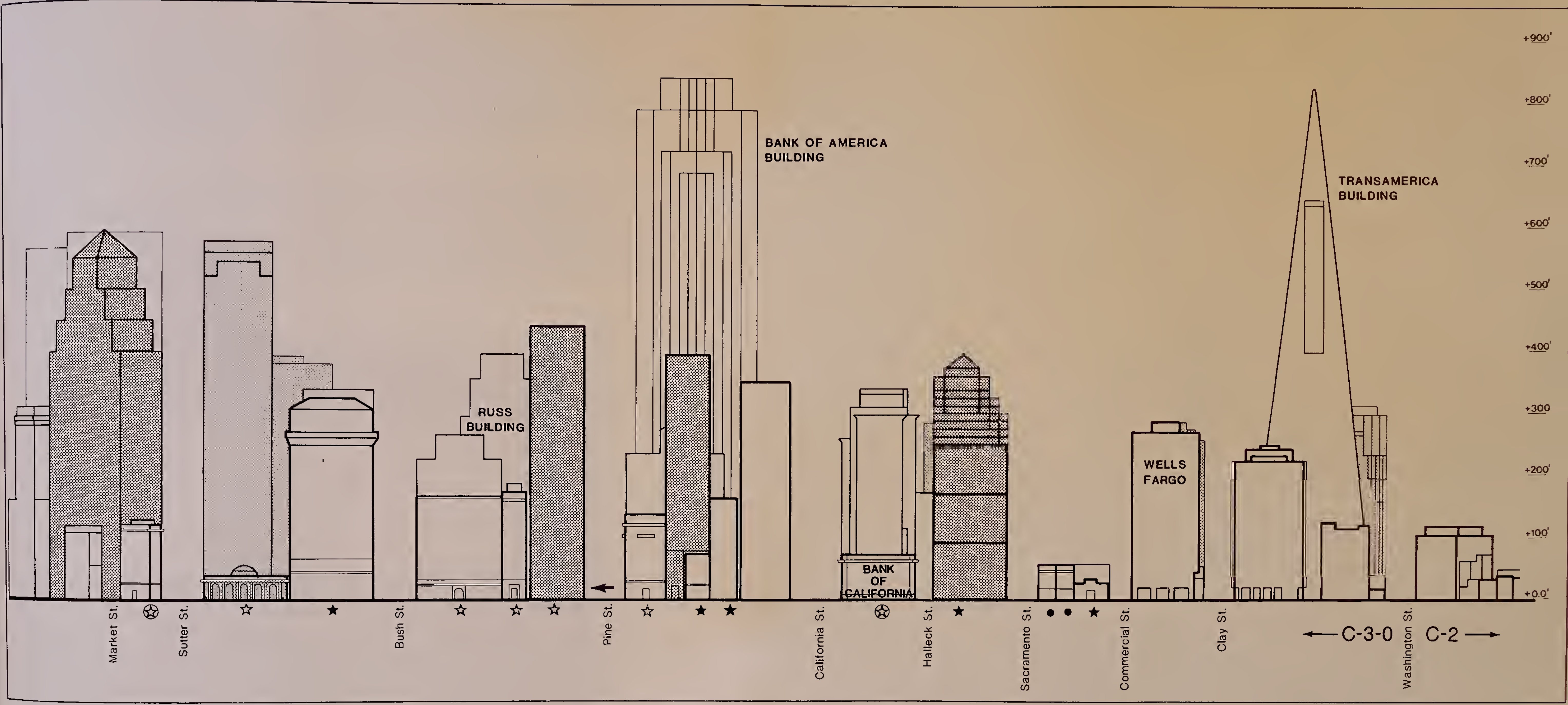


KEY MAP

ECKER STREET SECTION (Looking Southwest)

DEPTH OF IMAGE	
▨	BUILDING IN SECTION
□	BUILDING AT STREET FRONTAGE
□	BUILDING AT DEPTH OF UP TO ONE BLOCK
□	BUILDING AT DEPTH OF MORE THAN ONE BLOCK

ARCHITECTURAL RESOURCES	
✪	CITY LANDMARK
☆	HERITAGE A
★	HERITAGE B
•	HERITAGE C



SANSOME STREET SECTION (Looking West)

TIME OF BUILDING COMPLETION

☐ BEFORE 1983

☐ 1983-1984

▨ 1985-1990

▨ 1991-2000

PHOTO LOCATIONS

➔ LOCATION OF STREET-LEVEL PHOTO
(See Figures VII.14 and VII.19)

FIGURE VII.12:

C-3 DISTRICT STREETSCAPE, ALTERNATIVE 5, 2000

SOURCE: Roger Owen Boyer and Associates

Again, as in the analysis of the Downtown Plan, two represenative locations along the Sansome Street and Ecker Street cross-section were selected for detailed illustration of the possible effects of each Alterantive. At these two locations, Sansome and Pine Streets and 522/528 Howard Street, construction of new buildings is assumed to occur in the 1990s under each Alternative.

The provisions of each Alternative that are asssumed to apply to these hypothetical projects are shown in Table VII.H.3 The collective visual effects of the provisions of each Alternative on the streetscape environment at each of the two selected locations are depicted in Figures VII.13 through VII.19. See Figures IV.H.3 and IV.H.11 for comparisons with the companion effects of the Downtown Plan.

The provisions of the Downtown Plan and each Alternative that relate to streetscape and pedestrian amenities, and the degrees of compliance required, are presented in Table VII.H.4. The table indicates that the Downtown Plan explicitly requires, provides guidelines for, or otherwise encourages more streetscape amenities than any of the other five Alternatives.

Wind, Sun and Shadow

Downtown Plan

The Downtown Plan would result in building designs that are less likely to cause adverse pedestrian wind impacts than buildings built in conformance with the existing Planning Code. Reduced heights would lessen the exposure of new buildings to winds. Regulations relating to building form would result in tapered buildings with multiple setbacks and would discourage buildings with wide, uniform facades that are often associated with strong building-induced winds. The Downtown Plan contains a policy of wind tunnel testing of massing proposals to help ensure that adverse pedestrian winds are avoided, and suggests a maximum windspeed criterion of eight miles per hour in pedestrian areas.
(Text continues on p. VII.H.21.)

TABLE VII.H.3: REQUIREMENTS, BONUSES AND OPTIONS USED IN BUILDING DESIGNS FOR CASE STUDY SITES UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5

	Case Study Site Location	
	Sansome and Pine Streets; C-3-0 Use District	Howard Street; Mid-500 Block; C-3-S Use District
Downtown Plan	The existing building would be a Category I building; demolition would be prohibited. See Figure IV.H.3.	The existing one-story building would be demolished. It is a Category III structure with a Heritage rating of "B." * Floor Area Ratio (FAR): 6:1, plus TDR * Height and Bulk Limits: 450-S * First Floor Retail Use * Bulk Controls, see Chart A, Figure III.3 * Tower Separation, see Chart C, Figure III.3 o Cornices o Decorative Projections * Building Setbacks * Sun Access Angles o Recessed Windows o Harmony with existing buildings * Setbacks Dimensions o Street trees + Transfer Development Rights * Open Space See Figure IV.H.11.
Alternative 1	* Floor Area Ratio (FAR): 14:1 no maximum * Height and Bulk Limits: 500-I + Rapid Transit Proximity + Multiple Building Entrances + Sidewalk Widening + Shortened Walking Distance + Plaza + Side Setbacks x Mechanical Penthouse 16 ft. Above Height Limit See Figure VII.13	* FAR 17:1, no maximum * Height and Bulk Limits: 320-I + Multiple Building Entrances + Sidewalk Widening + Shortened Walking Distance (a) + Plaza See Figure VII.14

TABLE VII.H.3: REQUIREMENTS, BONUSES AND OPTIONS USED IN BUILDING DESIGNS FOR CASE STUDY SITES UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

	Case Study Site Location	
	Sansome and Pine Streets; C-3-0 Use District	Howard Street; Mid-500 Block; C-3-S Use District
Alternative 2	* FAR 12:1, maximum 18:1 * 500 ft. Height Limit (Bulk limits as defined) + Low Coverage at Upper Floors + Transit Proximity + Shortened Walking Distance (c) + Energy Conservation See Figure VII.15	* FAR 7:1, maximum 10.5:1 * 320 ft. Height Limit (Bulk limits as defined) + Plaza (b) + Shortened Walking Distance (a) + Energy Conservation See Figure VII.16
Alternative 3	* FAR 8:1, maximum 14:1 * Height and Bulk Limits: 260-I + Encouragement of Public Transit Usage + Energy Conservation Beyond that Mandated by Law + Improvement of Pedestrian Environment (d) + Development of New Housing in San Francisco See Figure VII.17	* FAR 5:1, maximum 8:1 * Height and Bulk Limits: 130-I + Construct New Housing Within 500 ft. of Site x Mechanical Penthouse 16 ft. above Height Limit See Figure VII.16
Alternative 4	* FAR 7:1, maximum 14:1 * 500 ft. Height Limit (Bulk limits as defined) + Provide Housing Elsewhere (Not shown) + Energy Conservation Bonus See Figure VII.18	* FAR 3.5:1, maximum 7:1 * 320 ft. Height Limit (Bulk limits as defined) + Provide Housing Elsewhere (Not shown) + Energy Conservation Bonus See Figure VII.16
Alternative 5	* FAR 12:1 maximum varies (see Alternative) * Height and Bulk Limits: 450-S * Housing (Partially provided on site including Open Space requirement)	* FAR 6:1 maximum varies (see Alternative) * Height and Bulk Limits: 550-S * Housing (Partially provided on site including Open Space requirement)

TABLE VII.H.3: REQUIREMENTS, BONUSES AND OPTIONS USED IN BUILDING DESIGNS FOR CASE STUDY SITES UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 (Continued)

	Case Study Site Location	
	Sansome and Pine Streets; C-3-0 Use District	Howard Street; Mid-500 Block; C-3-S Use District
Alternative 5 (Cont.)	* First Floor Retail (Not included in FAR) * Open Space and Recreation (1:25) + Plaza (see Alternative) + Through-Block Pedestrian Way (see Alternative) * Artworks o Street Trees o Cornice Line o Non-structural Decorative Features over Property Line o Flags, Awnings o Facade (Window) Treatment See Figure VII.19	* First Floor Retail * Open Space and Recreation (1:50) + Arcade (e) See Figure VII.14

NOTES:

* Denotes a requirement.
+ Denotes an option for which a floor area bonus is allowed.
x Denotes a building feature allowed.
o Denotes a building feature encouraged as necessary for consistency with neighboring buildings.

(a) Assumption that developer will provide public access through building lobby to Natoma St.
(b) Plaza Bonus would not be used
(c) Assumption that developer will provide public access to Sansome St. along south property line
(d) Assumption that developer will provide an arcade and street trees along Pine Street
(e) Assumption that developer will provide an arcade along Howard Street

SOURCE: Roger Owen Boyer and Associates

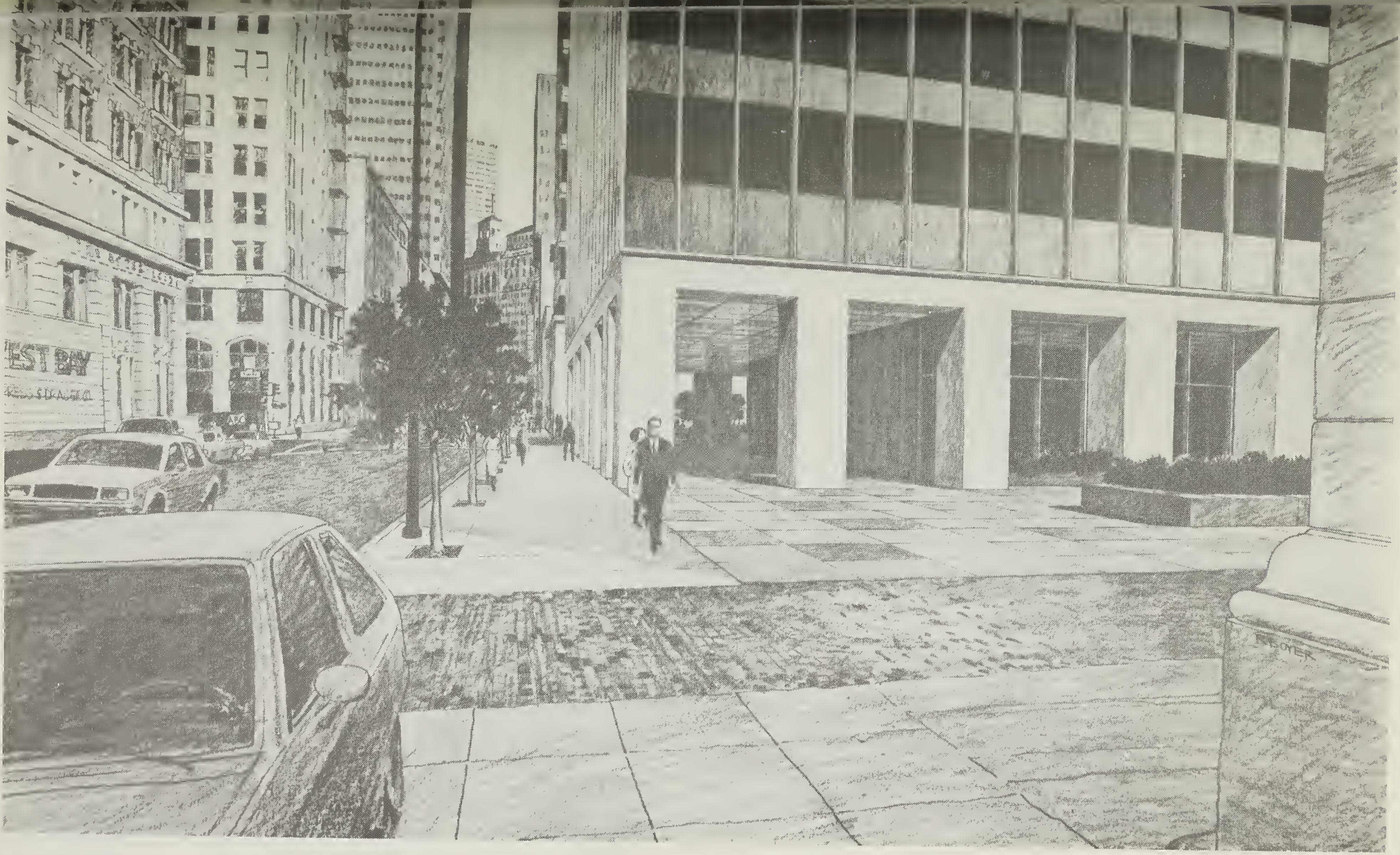


FIGURE VII.13:
PINE STREET/SANSOME STREET INTERSECTION, ALTERNATIVE 1, 2000

SOURCE: Roger Owen Boyer and Associates

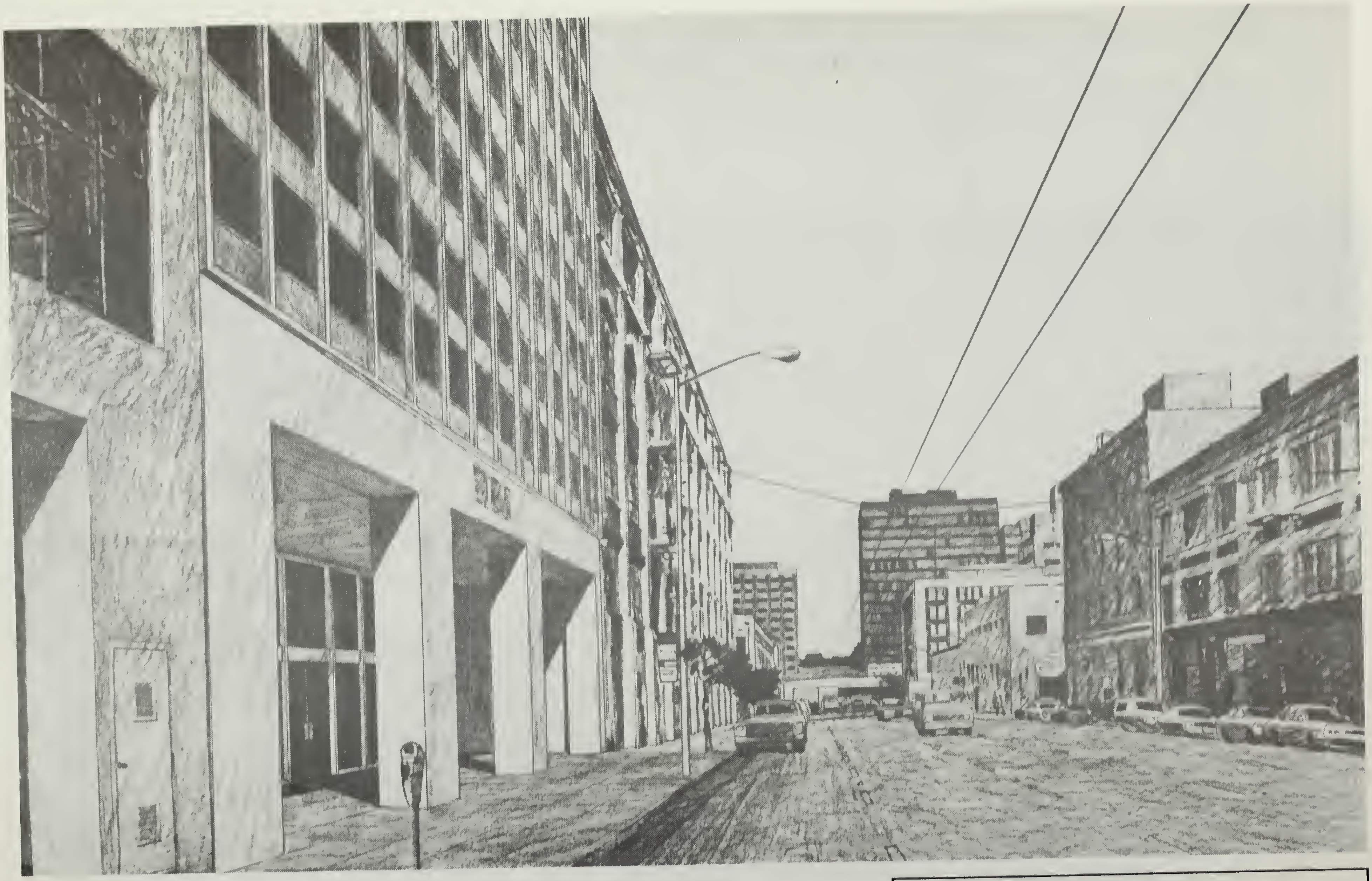


FIGURE VII.14:
522/528 HOWARD STREET,
ALTERNATIVES 1 AND 5, 2000

SOURCE: Roger Owen Boyer and Associates

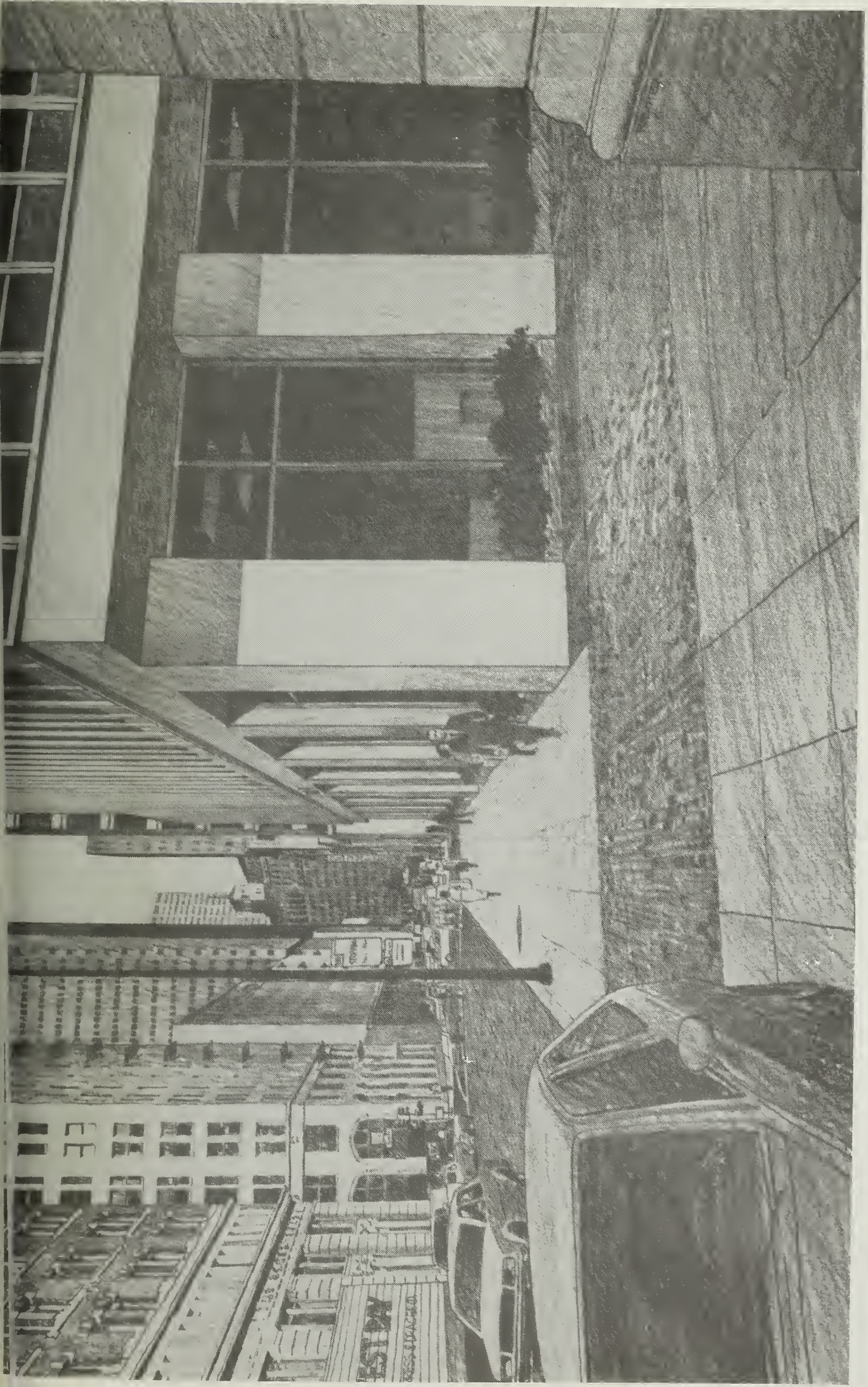


FIGURE VII.15:
PINE STREET/SANSOME STREET
INTERSECTION, ALTERNATIVE 2, 2000

SOURCE: Roger Owen Boyer and Associates

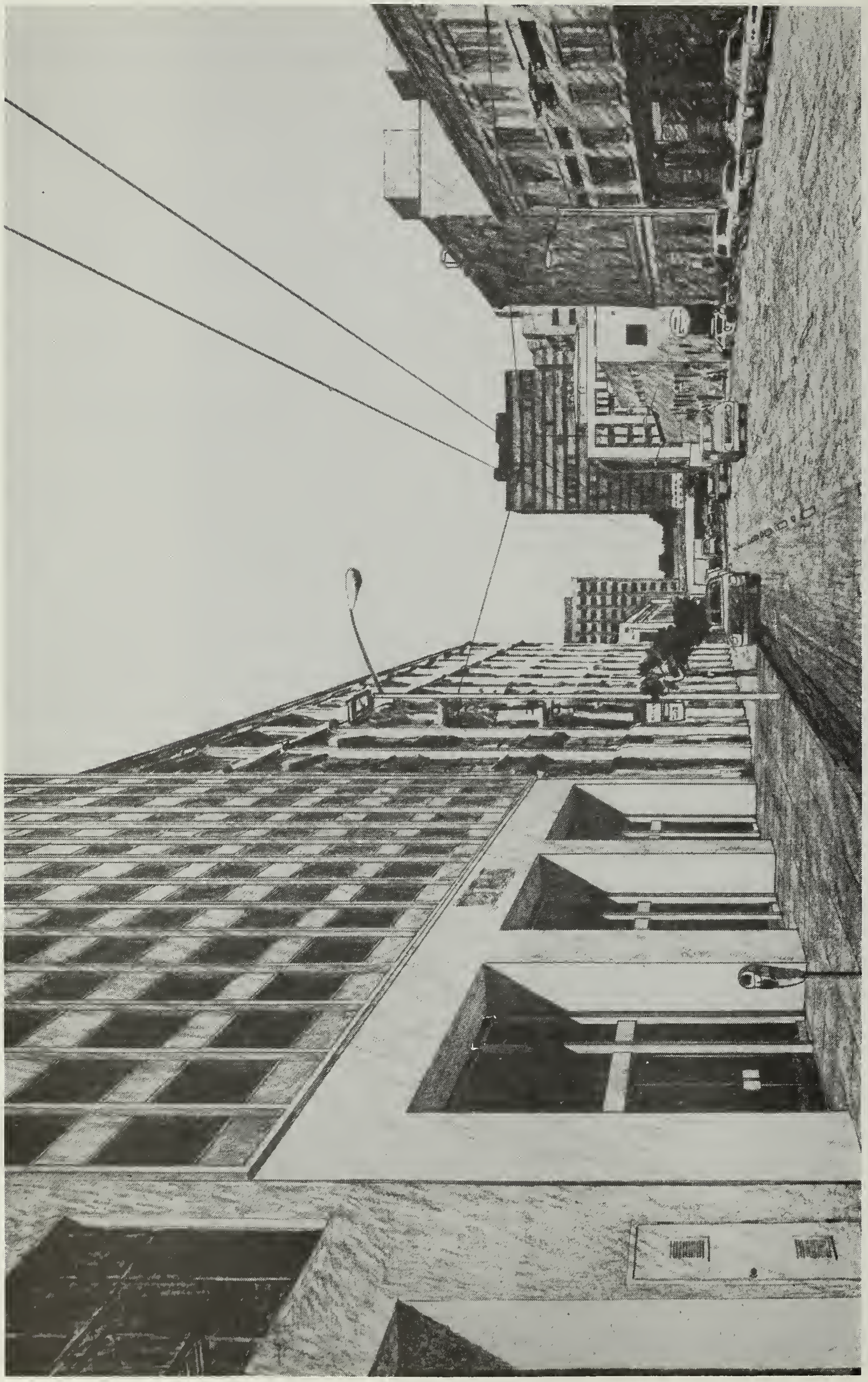


FIGURE VII.16:
522/528 HOWARD STREET,
ALTERNATIVES 2, 3 AND 4, 2000

SOURCE: Roger Owen Boyer and Associates

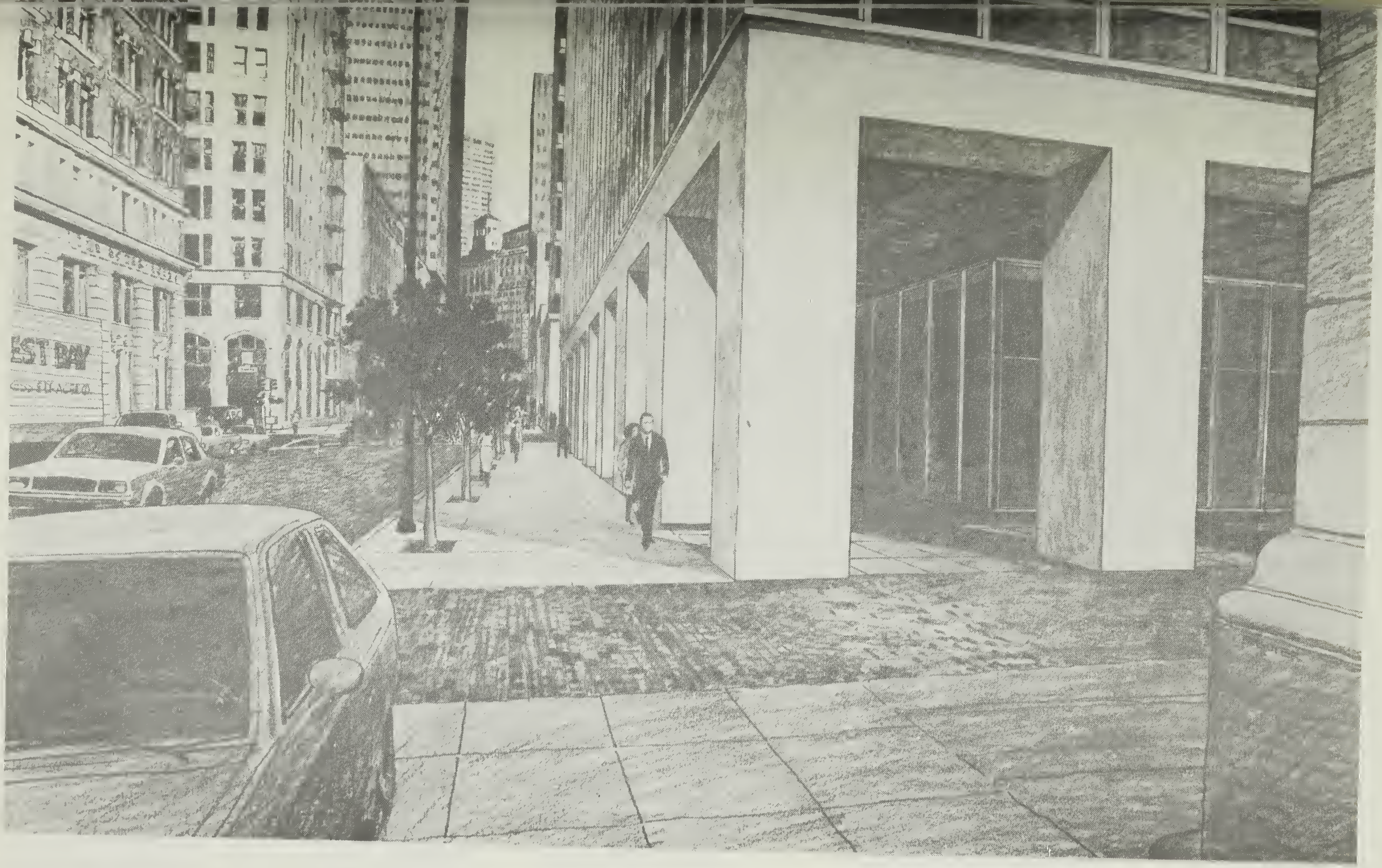


FIGURE VII.17:
PINE STREET/SANSOME STREET
INTERSECTION, ALTERNATIVE 3, 2000

SOURCE: Roger Owen Boyer and Associates

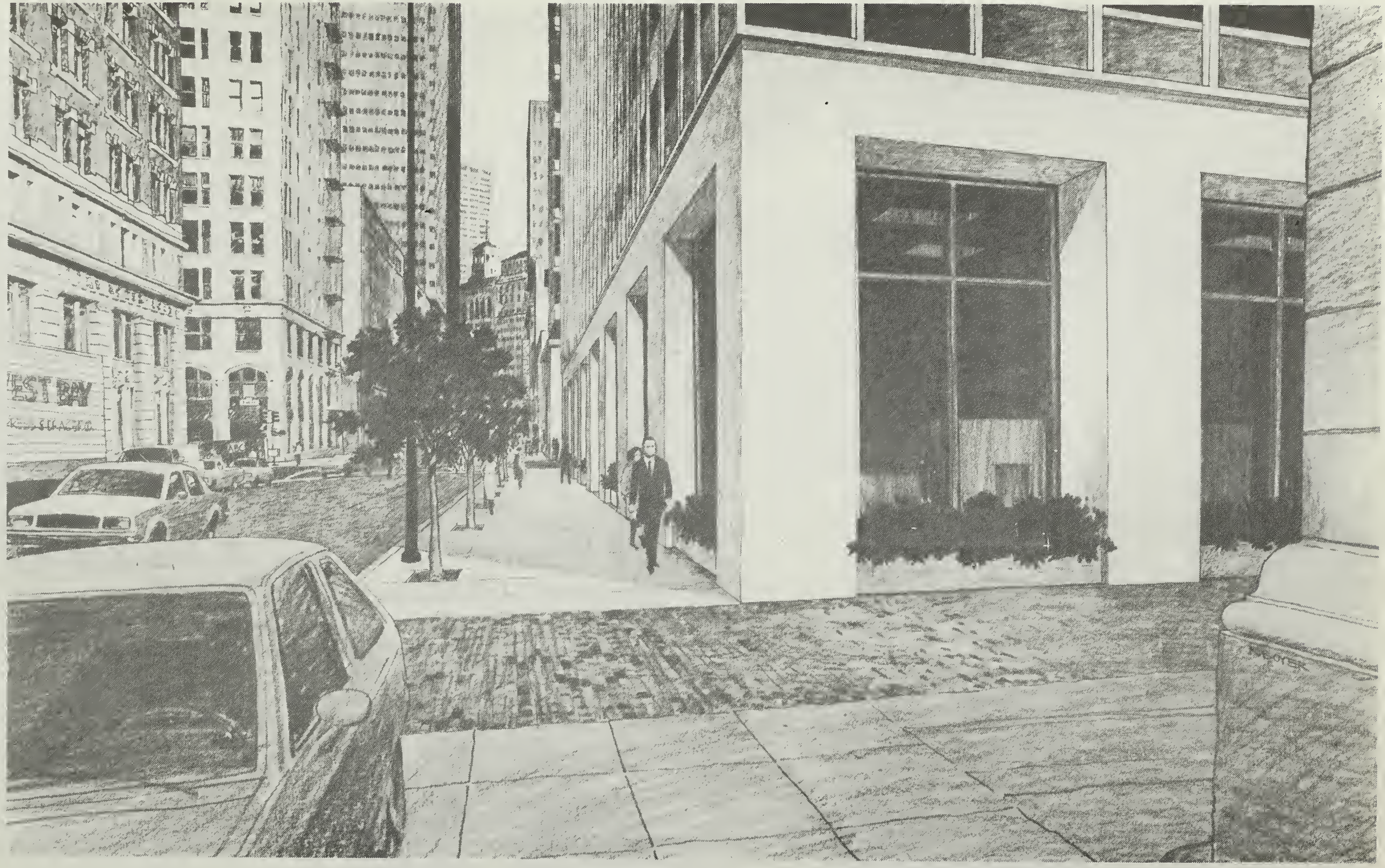


FIGURE VII.18:
PINE STREET/SANSOME STREET INTERSECTION, ALTERNATIVE 4, 2000

SOURCE: Roger Owen Boyer and Associates

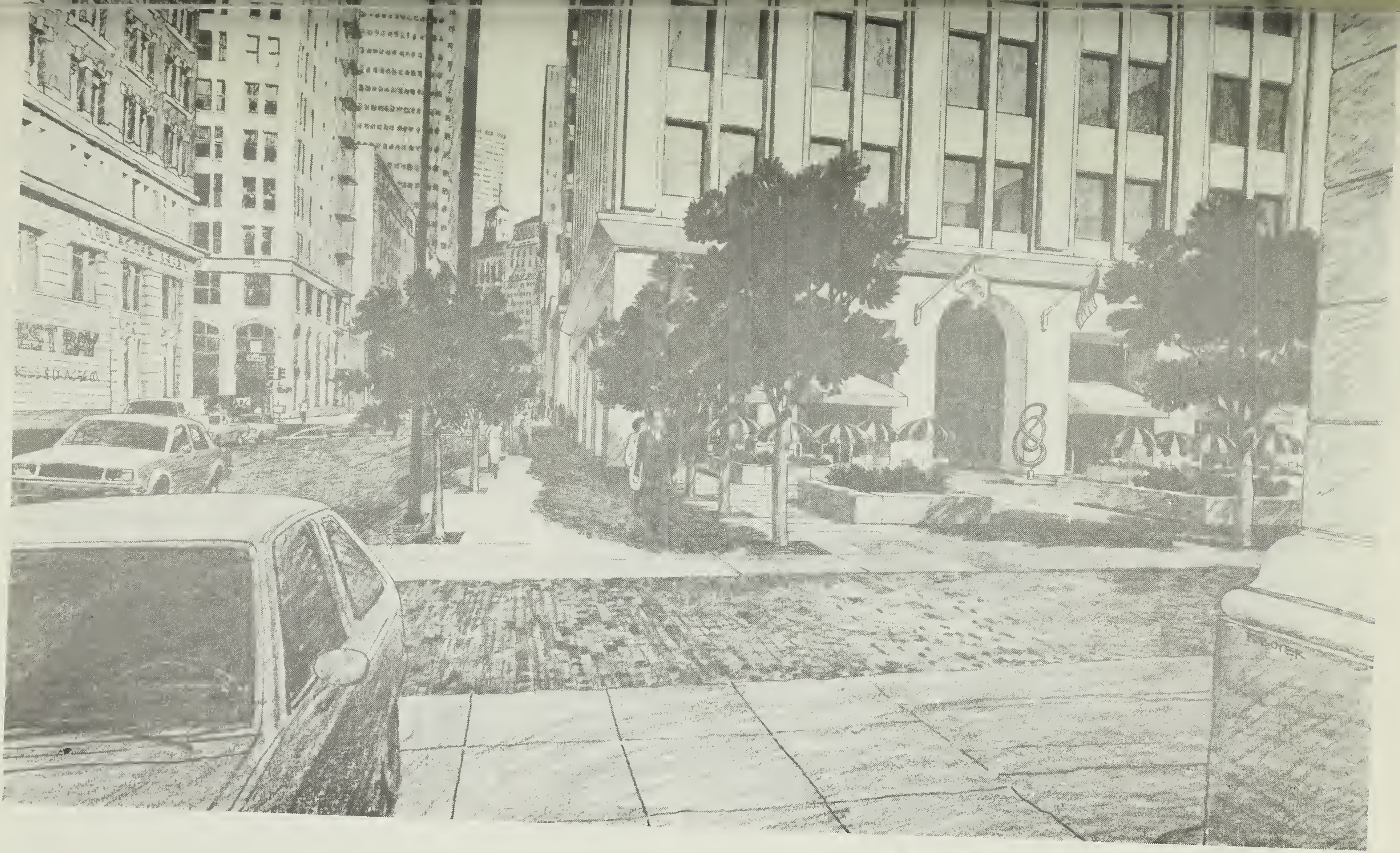


FIGURE VII.19:
PINE STREET/SANSOME STREET
INTERSECTION, ALTERNATIVE 5, 2000

SOURCE: Roger Owen Boyer and Associates

TABLE VII.H.4: PROVISIONS OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 RELATED TO STREETSCAPE AND PEDESTRIAN AMENITY

Pedestrian Amenities (a)	Downtown Plan (b)	Alternative (b)				
		1	2	3	4	5
- Provide Transition between New Large Buildings and Existing Smaller Buildings	P	N	N	N	N	P
-Discourage Accumulation of Large Properties	N	N	N	N	N	N
- Provide for Open Space and Landscaped Areas for Pedestrians	M	P	P	P	P	M
-Promote Large-Scale Landscaped Areas and Open Space	P	N	N	N	N	P
-Provide Street Trees	P	N	N	N	N	M
-Provide Landscaping to Screen Residential Areas from Commercial and Industrial Areas	N	N	N	N	N	N
-Provide Windbreaks, Other Design Measures to Reduce Wind	M	N	N	N	N	N
-Landscape Parking Areas for Protection of Pedestrian Areas	N	N	N	N	N	N
-Limit Garage Entrances Along Sidewalks	P	N	N	N	N	P
-Provide Retail and Commercial Facilities along Street	P	N	N	N	N	P
-Provide a Sense of Place with Shade, Shelter, Amenities and Conveniences	M	P	P	P	P	M
-Provide Landscape Furniture, Floorscape, Posts, Canopies, Enclaves, Focal Points, Enclosures	P	N	N	N	N	P
-Encourage Quality of Detail	P	N	N	N	N	P
-Provide Alternate Routes of Pedestrian Travel which Create Enclosure and a Variety of Spatial Experience	P	N	N	N	N	P
-Preserve Continuous Downtown Street Facades	M	N	N	N	N	P
-Provide Continuity of Existing Cornice and Parapet Lines	M	N	N	N	N	P
-Provide Richly Detailed Facades	P	N	N	N	N	P
-Limit Blank Walls at Street Level	P	N	N	N	N	P
-Limit Blank Walls at Second and Third Floors	P	N	N	N	N	N
-Provide Pedestrian Scale along Street by use of Arcades, Horizontal Divisions, etc.	P	P	P	N	N	[illegible]
-Provide Arcades for Covered Access to Buildings	N	P	N	N	N	[illegible]
-Require Sunlight in Building Plaza	M	N	M	N	M	M
-Locate Buildings so as not to Block Distant Views from Street	P	N	N	N	N	[illegible]
-Provide Planting and Paving in Alleys to Create a Commercial Promenade	P	N	N	N	N	[illegible]
-Protect Alleys in Residential Areas as Children Play Areas	N	N	N	N	N	N

TABLE VII.H.4: PROVISIONS OF DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5 RELATED TO STREETSCAPE AND PEDESTRIAN AMENITY (Continued)

Pedestrian Amenities (a)	Downtown Plan (b)	Alternative (b)				
		1	2	3	4	5
-Provide Mid-Block Pedestrian Shortcuts through Buildings	P	P	P	N	N	P
-Provide Dignified Signs on Commercial Buildings	N	N	N	N	N	P
-Protect Unique and Extraordinary Areas and Features of San Francisco	P	N	N	N	N	P
-Protect Adjacent Parks or Plazas from Building Shadows	M	N	N	N	N	N
-Design Buildings to Reflect Character of Adjacent Architectural Resources	P	N	N	N	N	P
-Provide Space for Shoppers, Groups, Vendors, Etc.	M	P	P	P	P	M
-Protect sun access of lunchtime malls	P	N	N	N	N	N
-Modify building forms to reduce local wind currents	M	N	N	N	N	N
-Require investment in art work	M	N	N	N	N	M

(a) Streetscape and Pedestrian Amenities are summarized and abstracted from Townscape, by Gordon Cullen, 1961, from The Comprehensive Plan of the City and County of San Francisco, The Urban Design Plan, August 26, 1971, adopted by Resolution No. 6745 of the City Planning Commission, and from Design of Cities, by Edmund N. Bacon, 1967.

(b) M - Amenity is mandatory
P - Provides guidelines and encourages amenities
N - No provision for this amenity

SOURCE: Roger Owen Boyer and Associates

The Downtown Plan also contains several sunlight-protection policies designed to reduce future reductions in sunlight duration at selected parks, plazas, public sidewalks, and pedestrian streets. Increased height limits and TDR provisions of the Plan for the South of Market Area would generally accelerate reduction of sunlight in that area, creating potential conflicts between height limits and sunlight access provisions of the Plan.

Alternatives

The relative impacts of five Alternatives are described in Section V.H.3 of the Consultants' Report, which is hereby incorporated by reference into this EIR.

The wind effects of construction between 1990 and 2000 cannot be quantified due to the project- and site-specificity of wind increases or decreases. The relative tendency of each Alternative to result in building designs that are associated with adverse wind impacts can be evaluated, however. The exposure of future buildings to west winds would be related to buildings heights associated with each Alternative. The tendency for new construction to have uniform or complex facades under each Alternative is indicated by its bulk regulations and other controls that affect the configuration and articulation of building shapes and surfaces.

The simplest factors that can be related to sunlight impact, and that allow differentiation among Alternatives, are building height and bulk. The amount of sky blocked from view by a building, and the reduction in sunlight duration, are directly proportional to each of these factors.

All five Alternatives would have greater impacts on wind and sunlight than would the Downtown Plan. Alternative 1 would allow for the tallest, bulkiest buildings and would have the greatest relative impacts on both sunlight and wind. Alternative 5, which would contain sun access provisions similar to, but less stringent than, the Downtown Plan would have the least relative impact of the five Alternatives. Alternatives 2, 3 and 4 would have relative wind and sunlight impacts generally intermediate to those of Alternatives 1 and 5.

Skyline Image

Downtown Plan

Skyline impacts under the Downtown Plan would be principally related to the densities of new development; heights and bulks of the buildings permitted; provisions for reducing bulk at upper levels; shaping tops and otherwise configuring building profiles; provisions for facade treatments and materials; and provisions for distribution of new growth, particularly with respect to existing topography and building forms. The Downtown Plan would include a system of bulk controls that would reduce building bulk at upper levels and shape building tops. In general, it would result in relatively low levels of development compared to the other Alternatives, would concentrate development south of Market Street and east of YBC, and would physically shape and geographically distribute new construction (see Figure IV.H.17, p. IV.H.46).

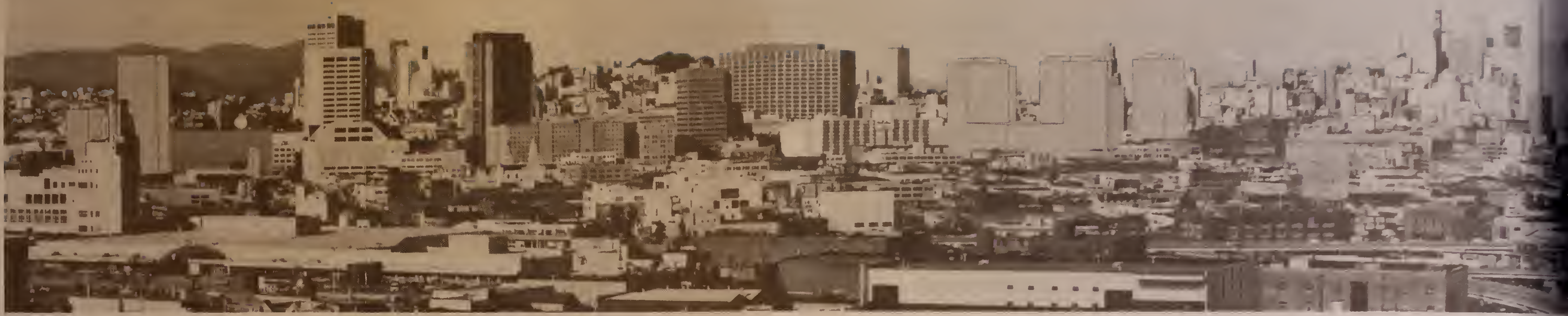
Alternatives

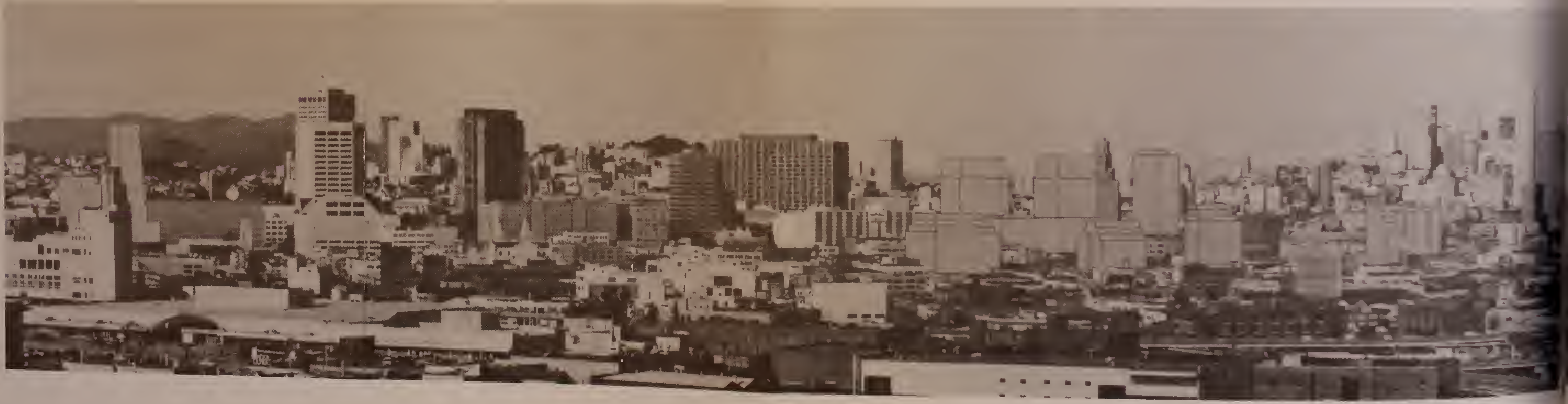
The No Project Alternative (Alt. 1) is the Alternative for which the most intense downtown development is forecast by the year 2000 (see Figure VII.20)./1/ Floor area ratio (FAR) regulations would generally limit buildings to about 600 feet in height in the central Financial District, although some could approach the height limit of 700 feet. Rectilinear office buildings, similar in height to the most recent generation of highrise office buildings, but shorter than the Bank of America Headquarters, would fill many of the spaces in the 1982 skyline and would block views to and from many of the buildings visible in 1982. The downtown office core would expand toward the Bay Bridge and Nob Hill, filling in a low-density area apparent in the 1984 skyline (see Figure IV.H.7, p. IV.H.23) that signals the eastern edge of the Union Square Retail District at Kearny Street. A few relatively large buildings would also be built along Market Street towards the Civic Center.

By the year 2000, Alternative 2 would result in highrise office construction at heights up to 575 feet in an area centered on the Financial District and including lower Market Street and the Kearny Street corridor (see Figure VII.21)./1/ New buildings would be visually characterized by the setbacks at upper levels required under this Alternative. Additional large developments would probably be built along Market Street towards the Civic Center. Midrise residential construction would occur primarily south of Market Street, between Fourth and Twelfth Streets.

Under Alternative 3, the heights of new office buildings would be perceptibly lower than the prevailing heights of most recent buildings, and buildings likely to be built under the Downtown Plan and the other Alternatives, with a maximum height of 260 feet (see Figure VII.22)./1/ In bulk and shape, however, they would be similar to many recent buildings with rectilinear volumes and square tops. New construction would occur at the edges of the Financial District in the South of Market area, at the foot of Market Street, in the Kearny Street/Union Square area, and in the Civic Center area.

Alternative 4 would require residential construction or rehabilitation in connection with downtown office construction and would encourage the construction of housing in the C-3 Use District. Midrise residential construction would be likely to occur primarily south of Market Street, between 4th and 12th Streets. Under this Alternative, the heights of new buildings would be somewhat lower than the prevailing heights of contemporary highrise office buildings (see Figure VII.23)./1/ The maximum height permitted under this





NOTES:
-See Figure IV.H.8 for a reference key to selected existing buildings and buildings to be completed by 1990.
-See also Note 1, page VII.H.28.

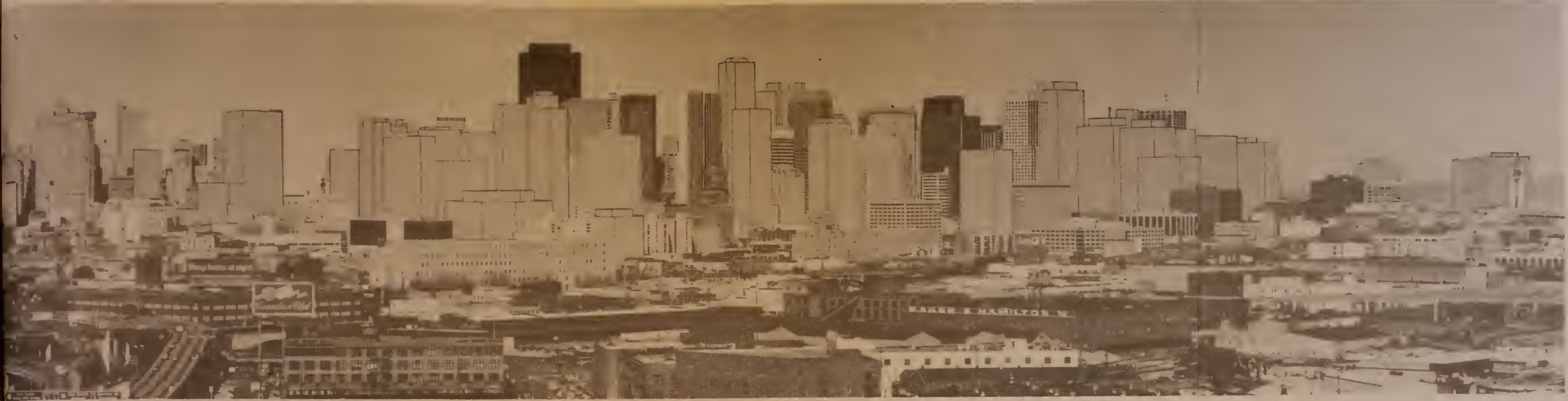


FIGURE VII.20
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, ALTERNATIVE 1, 2000
SOURCE: Roger Owen Boyer and Associates

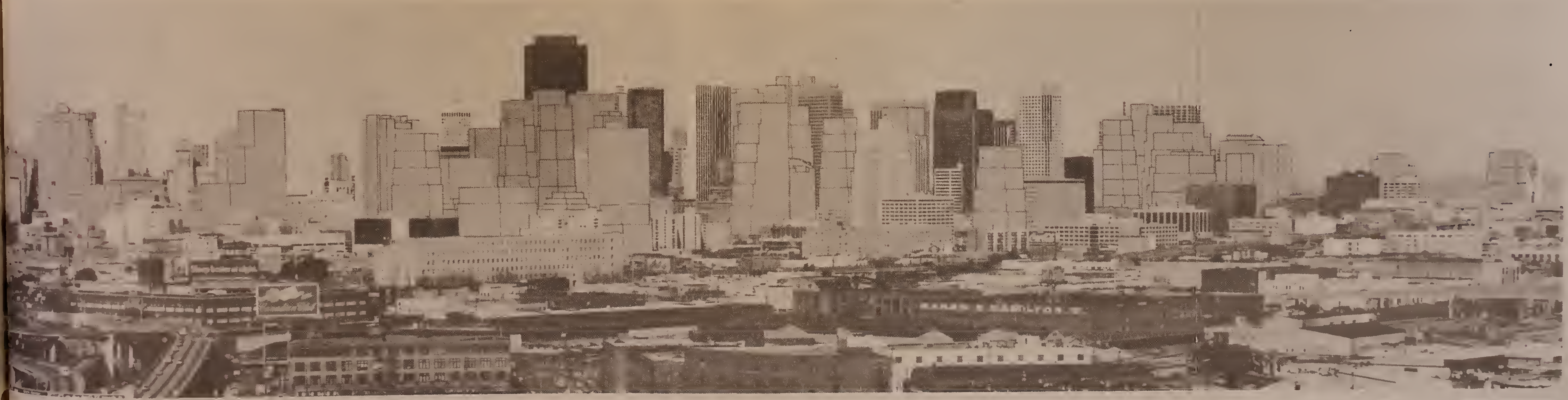
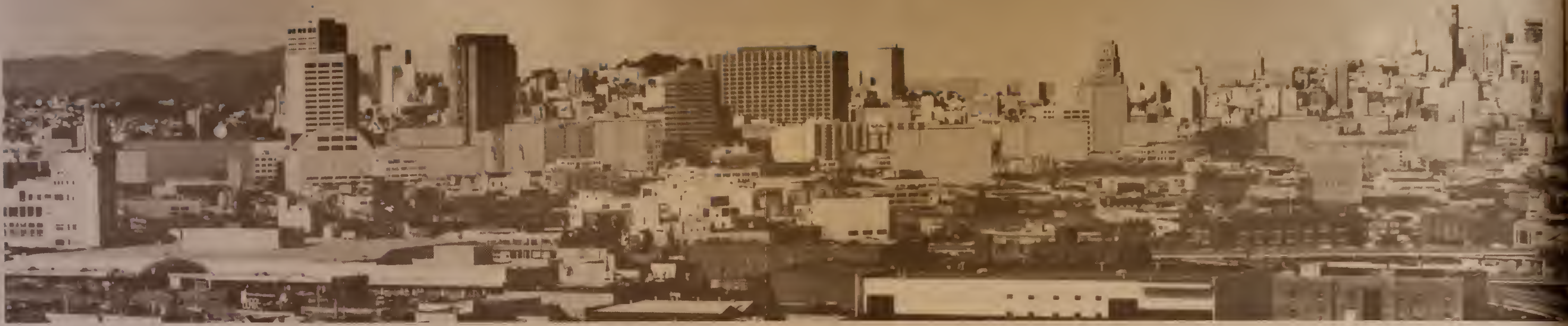
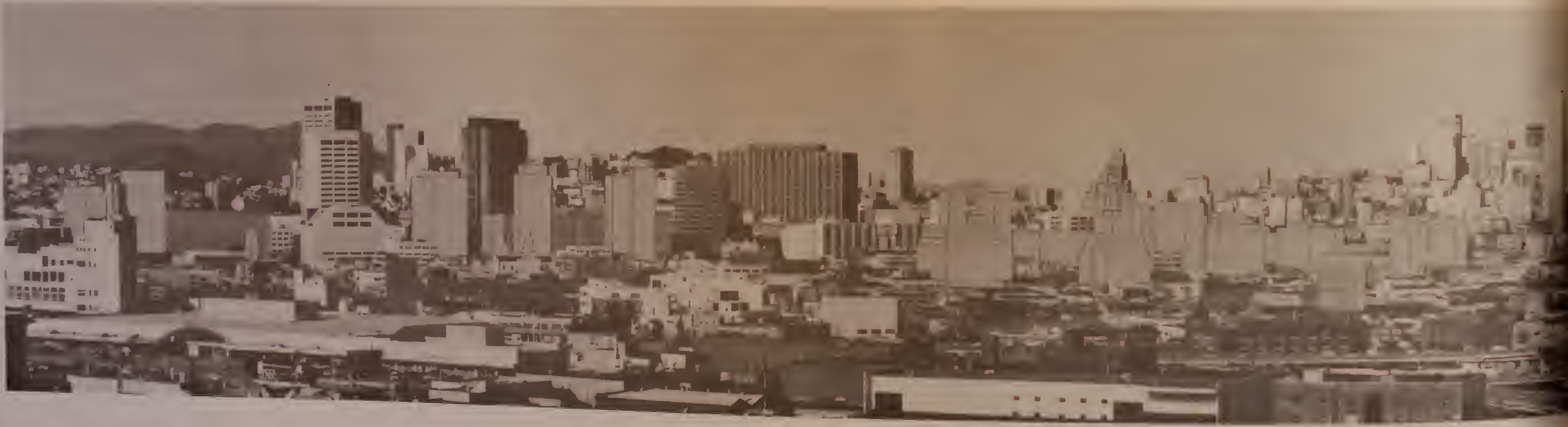


FIGURE VII.21
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, ALTERNATIVE 2, 2000
SOURCE: Roger Owen Boyer and Associates





NOTES.
-See Figure IV.H.8 for a reference key to selected existing buildings and buildings to be completed by 1990.
-See also Note 1, page VII.H.28.

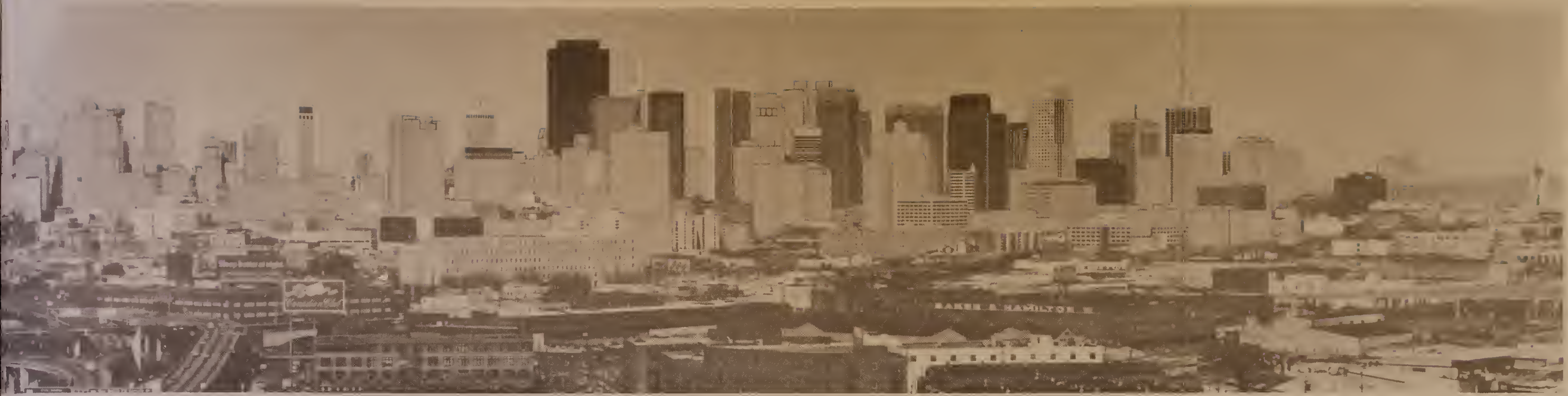


FIGURE VII.22
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, ALTERNATIVE 3, 2000
SOURCE: Roger Owen Boyer and Associates

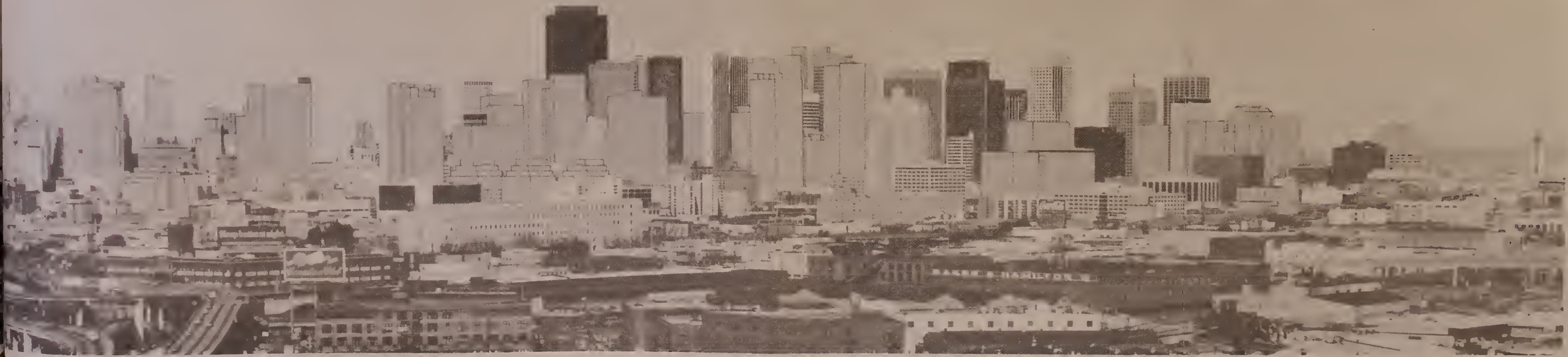
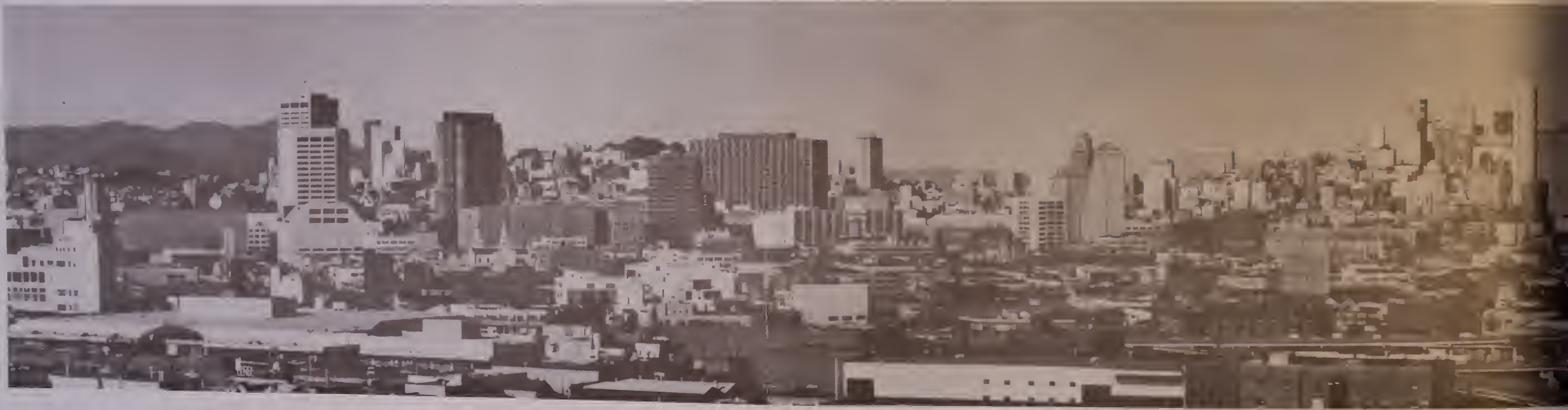


FIGURE VII.23
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, ALTERNATIVE 4, 2000
SOURCE: Roger Owen Boyer and Associates



NOTES:
-See Figure IV.H.8 for a reference key to selected existing buildings and buildings to be completed by 1990.
-See also Note 1, page VII.H.28.

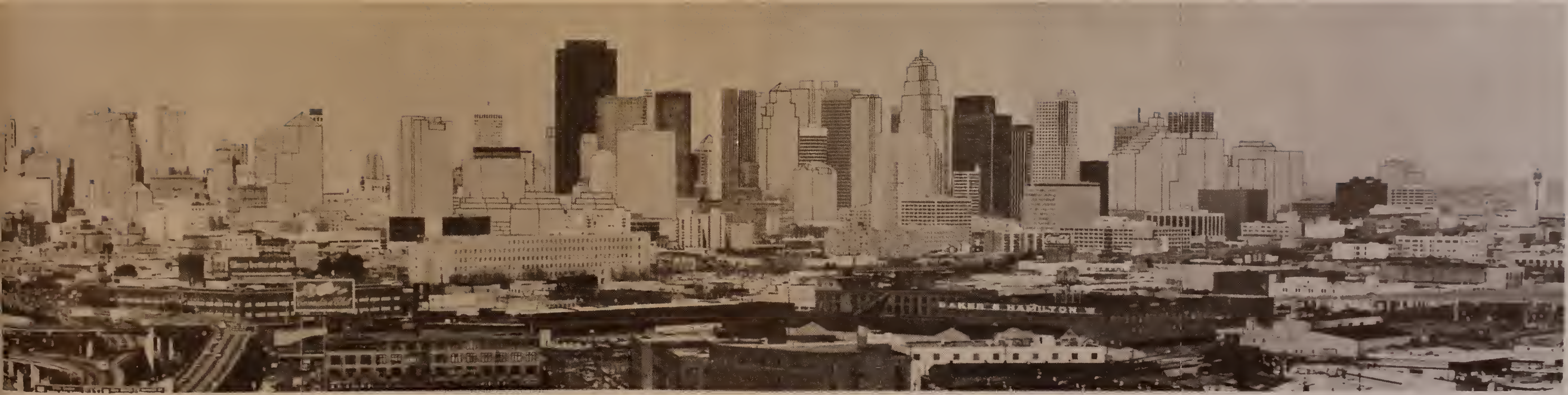


FIGURE VII.24
C-3 DISTRICT SKYLINE AS SEEN FROM POTRERO HILL, ALTERNATIVE 5, 2000
SOURCE: Roger Owen Boyer and Associates

Alternative would be 575 feet. As with the Alternatives discussed above, some expansion of the Financial District office core towards the Bay Bridge and into the Kearny Street corridor would occur. Several buildings larger and taller than the presently prevailing size would be likely to be constructed in the vicinity of Market and Van Ness Streets and others would be built along Market Street, including office, residential and mixed-use buildings.

Alternative 5 would provide more variety in the heights of buildings, because of more extensive use of TDRs, and more variety in the treatments of building tops, because of bulk controls which would encourage setbacks at upper levels and provide bonuses for more varied roof shapes (see Figure VII.24)./1/ Because of the combination of height, bulk and TDR provisions in this Alternative, it would result in several new buildings of relatively bulky scale to the east and west of the present office core, and some new midrise structures south of Market Street. Some sightlines between buildings would be filled and several older buildings obscured, but to a lesser extent than in Alternatives 1, 2, 3 and 4.

The skyline impacts and mitigation measures of the Downtown Plan and each Alternative are summarized in Table VII.H.5.

TABLE VII.H.5: SKYLINE IMAGE IMPACTS AND MITIGATION MEASURES UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5

	Mitigation Measures and Alternatives that include Mitigation Measures			
Skyline Image Impact	Height and Floor Area (FAR) Controls	Use District Revisions (indirectly determine maximum heights/bulks)	Bulk controls (except shape and setback controls)	Controls for Shape and Setbacks at Upper Levels
"Benching" effect in building clusters	DTP,2,4,5	DTP(a),4,5	DTP	DTP,2,5
Uniformly rectilinear ("Square") building tops	NA(b)	NA(b)	NA(b)	DTP,2,5
Reduced variation in sky/building interface	DTP,2,5	DTP,4,5	All	DTP,2,5
Reduced sightlines through building clusters	NA(b)	DTP,3,4,5	All	DTP,2,5
Blockage of views from existing buildings	3	DTP,4,5	All	DTP,2,5
Conflicts with topographic forms and existing visual landmarks	All	DTP,4,5	All	DTP,2,5

(a) DTP = Downtown Plan

(b) NA means Not Applicable; the measure does not mitigate the impact.

SOURCE: Roger Owen Boyer and Associates and Environmental Science Associates, Inc.

NOTE - Architectural/Historic Resources and Urban Design

/1/ Figures VII.20 through VII.24 depict possible views of skyline conditions in the year 2000 as they might appear under each of the Alternatives 1 through 5. These graphics are not intended to be, nor can they be, accurate as to the specific configurations and locations of projects that were not yet proposed or built at the time of EIR preparation. The graphics are, however, faithful to configurations and distributions of possible future development, given the design controls embodied in each Alternative, the development forecasts by C-3 District subarea for each Alternative, and the distributions of reasonably developable sites within these subareas.

NOTE - Architectural/Historic Resources and Urban Design (Continued)

Since the production of the original graphics for this report, the San Francisco Redevelopment Agency has refined its proposals for specific projects in the Yerba Buena Center (YBC) Redevelopment Area. In Figures IV.H.16 and IV.H.17 (see page IV.H.46), the revised YBC proposals are represented in a darker shade than the other projects shown. As the YBC proposals would not be affected by any of the Alternatives (or the Downtown Plan), Figures VII.20 through VII.24 have not been altered to reflect these refinements. By superimposing the YBC portions of Figure IV.H.16 or IV.H.17 upon the corresponding portions of Figures VII.20 through VII.24, the reader may observe the effects of the refined YBC proposals in the context of possible development under each Alternative.

I. AIR QUALITY

Compatibility with 1982 Bay Area Air Quality Plan

The Downtown Plan and all the Alternatives would be compatible with the 1982 Bay Area Air Quality Plan, because they would not directly conflict with the Air Quality Plan's hydrocarbon and carbon monoxide emission control strategies, nor would they indirectly conflict with the Air Quality Plan's objectives of attaining the federal ozone and carbon monoxide standards. These analyses do not take into account emissions from traffic travelling to work locations in other areas of the region that may be less well-served by transit, instead of to work in the C-3 District, that may occur as a result of the Plan or some other alternative. These emissions are not expected to be significant or substantial additions to the regional pollutant totals.

Pollutant Emissions

Downtown Plan

Total hydrocarbon (HC) emissions associated with downtown-related motor vehicle travel and with natural gas combustion by downtown buildings under the Downtown Plan are projected to be greater in 2000 than in 1990; nitrogen oxides (NOx) and carbon monoxide (CO) emissions are projected to be less. Emissions of all three pollutants under the Downtown Plan would be less in 2000 than in 1984, because declining HC, NOx, and CO emission rates per average motor vehicle would more than offset the increased number of emission sources. Emissions of total suspended particulates (TSP) and sulfur oxides (SOx) under the Downtown Plan are projected to be greater in 2000 than in 1990 or in 1984, because average-vehicle emission rates would decline only slightly for TSP and not at all for SOx.

Alternatives

The Downtown Plan would generate less emissions than would the No-Project Alternative (Alternative 1) and Alternatives 2 and 3, and more than would Alternatives 4 and 5. Alternative 1 would generate the most emissions: about 38% more in 2000 (from development between 1990 and 2000) than the Downtown Plan. Alternative 4 would generate the least emissions: about seven percent less than the Downtown Plan. Emissions generated by Alternatives 2, 3, and 5 would fall within this range. Estimated

TABLE VII.I.1: ESTIMATED AND PROJECTED DOWNTOWN-RELATED AND BAY AREA POLLUTANT EMISSIONS, 1984, 1990, and 2000 UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 AND 4 (tons per day) (a,b)

	HC	NOx	CO	TSP	SOx
1984 Total					
Downtown-related vehicular travel	5.7	8.1	70.6	7.8	0.7
Downtown building natural gas use	0.1	1.0	0.2	0.1	0
Total Downtown (c)	5.8	9.1	70.8	7.9	0.7
Total Bay Area (d)	541	581	2594	515	187
1990 Increment					
Downtown-related vehicular travel	0.6	0.8	6.8	1.1	0.1
Downtown building natural gas use	0	0	0	0	0
Subtotal Downtown (e)	0.6	0.8	6.8	1.1	0.1
Subtotal Bay Area (f)	-113	-23	-642	+47	+7
1990 Total					
Downtown-related vehicular travel	4.7	6.1	56.0	8.9	0.8
Downtown building natural gas use	0.1	1.1	0.2	0.1	0
Total Downtown (c)	4.8	7.2	56.2	9.0	0.8
Total Bay Area (d)	428	558	1952	562	194
Downtown Plan 2000 Increment					
Downtown-related vehicular travel	0.6	0.8	6.6	1.3	0.1
Downtown building natural gas use	0	0.1	0	0	0
Subtotal Downtown (g)	0.6	0.8	6.6	1.3	0.1
Subtotal Bay Area (h)	0	+52	-69	+87	+39
Downtown Plan 2000 Total					
Downtown-related vehicular travel	5.0	5.9	53.5	10.0	0.9
Downtown building natural gas use	0.1	1.1	0.2	0.1	0
Total Downtown (c)	5.1	7.1	53.7	10.1	0.9
Total Bay Area (d)	428	610	1883	649	233
Alternative 1 2000 Increment					
Downtown-related vehicular travel	0.9	1.0	9.1	1.8	0.2
Downtown building natural gas use	0	0.1	0	0	0
Subtotal Downtown (g)	0.9	1.2	9.1	1.8	0.2
Subtotal Bay Area (h)	0	+52	-69	+87	+39
Alternative 1 2000 Total					
Downtown-related vehicular travel	5.3	6.2	56.0	10.5	1.0
Downtown building natural gas use	0.1	1.2	0.2	0.1	0
Total Downtown (c)	5.4	7.4	56.2	10.6	1.0
Total Bay Area (d)	428	610	1883	649	233

(Continued)

TABLE VII.I.1: ESTIMATED AND PROJECTED DOWNTOWN-RELATED AND BAY AREA POLLUTANT EMISSIONS, 1984, 1990, and 2000 UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 AND 4 (tons per day) (a,b) (Continued)

	HC	NOx	CO	TSP	SOx
Alternative 4 2000 Increment					
Downtown-related vehicular travel	0.6	0.7	6.1	1.2	0.1
Downtown building natural gas use	0	0.1	0	0	0
Subtotal Downtown (g)	0.6	0.8	6.1	1.2	0.1
Subtotal Bay Area (h)	0	+52	-69	+87	+39
Alternative 4 2000 Total					
Downtown-related vehicular travel	5.0	5.9	53.0	9.9	0.9
Downtown building natural gas use	0.1	1.1	0.2	0.1	0
Total Downtown (c)	5.1	7.0	53.2	10.0	0.9
Total Bay Area (d)	428	610	1883	649	233

(a) Totals may not equal sums of components due to rounding. Downtown emissions were calculated using BAAQMD EMFAC-6C vehicular emission factors and EPA AP-42 natural gas combustion emission factors. Vehicular emissions of HC, NOx, and CO include an assumed three minutes of idling time per trip. Vehicular emissions of TSP include 2.0 grams per mile for dust re-entrainment on paved roads.

(b) Alternative 1, No Project, would be the worst-case scenario; Alternative 4 would be the best-case scenario. The Downtown Plan and Alternatives 2, 3, and 5 would fall within this range.

(c) Accumulative total regional traffic and building natural gas emissions associated with all C-3 District employment/visitation and buildings, respectively, for each scenario

(d) Accumulative total regional emissions associated with all Bay Area pollutant sources for each year

(e) Incremental regional traffic and building natural gas emissions associated with new C-3 District employment/visitation and buildings, respectively, added between 1984 and 1990

(f) Incremental change in regional emissions associated with all Bay Area pollutant sources between 1984 and 1990

(g) Incremental regional traffic and building natural gas emissions associated with new C-3 District employment/visitation and buildings, respectively, added between 1990 and 2000

(h) Incremental change in regional emissions associated with all Bay Area pollutant sources between 1990 and 2000

SOURCE: Environmental Science Associates, Inc.; and ABAG, BAAQMD, MTC, 1982 Air Quality Plan, pp. 42, 53, and 112.

1984, projected 1990, and projected 2000 emissions under the Downtown Plan and Alternatives 1 and 4, associated with downtown-related motor vehicle travel and with natural gas combustion by downtown buildings, are shown in Table VII.I.1.

Total HC and NOx emissions under the No-Project Alternative (Alternative 1) are projected to be greater in 2000 than in 1990; CO emissions are projected to be the same. Total HC emissions under Alternative 4 and the Downtown Plan are projected to be greater in 2000 than in 1990; NOx and CO emissions are projected to be less. Emissions of all three pollutants under the Downtown Plan and all Alternatives would be less in 2000 than in 1984. Emissions of TSP and SOx under the Downtown Plan and all Alternatives are projected to be greater in 2000 than in 1990 or in 1984.

Ozone Concentrations

Downtown Plan

An imbalance between projected HC and NOx emissions (both of which are chemical precursors of ozone) would exist under the Downtown Plan; that is, incremental NOx emissions would exceed HC emissions by about 0.2 tons per day. Thus, on the basis of the LIRAQ ozone simulations conducted for the 1982 Bay Area Air Quality Plan, Bay Area ozone concentrations would be expected to be within the federal standard in 1987 and thereafter through the year 2000, regardless of development of new commercial space in downtown San Francisco under the Downtown Plan. Furthermore, development in downtown San Francisco would not increase the Bay Area ozone concentrations which would otherwise occur (because of the NOx "quenching" effect predicted by the LIRAQ simulations). However, excess NOx emissions might have a relatively small effect (compared to that of total Bay Area or non-Bay Area emissions) on increasing ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area.

Alternatives

An imbalance between HC and NOx emissions similar to that under the Downtown Plan would also exist for all the Alternatives; that is, NOx emissions would exceed HC emissions, ranging from about 0.3 tons per day under Alternative 1 to about 0.2 tons per day under Alternative 4 (see Table VII.I.1). Thus, Bay Area ozone concentrations would be expected to be within the federal standard in 1987 and thereafter regardless of development of new commercial space in downtown San Francisco under any of the Alternatives. Furthermore, development in downtown San Francisco under any of the Alternatives would not increase the Bay Area ozone concentrations which would otherwise occur. However, excess NOx emissions might have a relatively small effect (compared to that of total Bay Area or non-Bay Area emissions) on increasing ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area. This effect would be greatest with the No-Project Alternative (Alternative 1) and least with Alternative 4; the Downtown Plan and Alternatives 2, 3, and 5 would fall within this range.

Carbon Monoxide Concentrations

Downtown Plan

The projected decrease in average-vehicle CO emission rates would more than offset the projected increase in area-wide and local traffic volumes under the Downtown Plan. Thus in 1990 and 2000, CO concentrations at the 11 selected intersections in the downtown study area (analyzed with the Modified Linear Rollback method) would be within the state and federal standards under the Downtown Plan.

Alternatives

CO concentrations would be lowest under the Downtown Plan and Alternatives 4 and 5, in which the three scenarios would be essentially the same, and highest under the No-Project Alternative (Alternative 1) (see Table VII.I.2). Alternatives 2 and 3 would fall within this range. The relationship between traffic volumes (area-wide and local) and average-vehicle CO emission rates that would exist under the Downtown Plan would also exist under all of the Alternatives; that is, decreased CO emission rates would more than offset increased traffic. Thus, CO concentrations at the 11 selected intersections would be within the state and federal standards under any of the Alternatives.

Total Suspended Particulate Concentrations

Downtown Plan

Annual average TSP concentrations (and possibly the frequency of violations of TSP standards, with concomitant health effects and reduced visibility) in San Francisco would increase by about three percent from 1990 to 2000 and by about seven percent from 1984 to 2000 under the Downtown Plan, because decreased average-vehicle TSP emission rates would not offset increased area-wide traffic volumes.

Alternatives

Annual average TSP concentrations (and possibly the frequency of violations of TSP standards, with concomitant health effects and reduced visibility) in San Francisco would also increase with all of the Alternatives. The increase in TSP concentrations would be least under the Downtown Plan and Alternatives 4 and 5 (in which the three scenarios would be essentially the same), about three percent from 1990 to 2000 and about seven percent from 1984 to 2000. The increase in TSP concentrations would be highest under Alternative 1, about five percent from 1990 to 2000 and about nine percent from 1984 to 2000. Alternatives 2 and 3 would fall within this range.

Nitrogen Dioxide Concentrations

Downtown Plan

NOx emissions associated with the entire downtown study area would decrease under the Downtown Plan, because decreased NOx emission rates would more than offset increased traffic. However, the incremental emissions associated with new downtown development could add to the increase expected for the entire Bay Area. NOx emissions (and possibly the frequency of violations of the NO_2 standard, with concomitant health effects, reduced visibility, and increased formation of acid rain downwind) would increase the expected Bay Area increase from 1984 to 2000 by about five percent (or less).

Alternatives

NOx emissions associated with the entire downtown study area would also decrease with all of the Alternatives. However, the incremental emissions associated with new downtown development could add to the increase expected for the entire Bay Area. The increase in NOx emissions (and possibly the frequency of violations of the NO_2 standard, with concomitant health effects, reduced visibility, and increased formation of acid rain downwind) would be least under the Downtown Plan and Alternatives 4 and 5 (in which the three scenarios would be essentially the same), about five percent (or less) of the expected Bay Area increase. The NOx increase would be highest under Alternative 1, about six percent (or less) of the expected Bay Area increase from 1984 to 2000. Alternatives 2 and 3 would fall within this range.

TABLE VII.1.2: EXISTING AND PROJECTED WORST-CASE CURBSIDE CARBON MONOXIDE CONCENTRATIONS, AT SELECTED INTERSECTIONS IN THE DOWNTOWN STUDY AREA, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN AND ALTERNATIVE 1 (parts per million) (a)

		Concentrations (b)			
				2000	
Intersection	Averaging Time	1984	1990	Downtown Plan	Alternative 1
Battery & Washington	1-hour	13.0	9.5	8.3	8.4
	8-hour	8.9	6.5	5.8	5.8
Battery & Clay	1-hour	13.0	9.5	8.3	10.6
	8-hour	8.6	6.7	6.0	6.0
Beale & Mission	1-hour	12.0	9.8	8.8	8.9
	8-hour	8.3	6.8	6.1	6.2
Brannan & Sixth	1-hour	18.1	12.3	11.5	11.7
	8-hour	12.0	9.0	8.3	8.4
Bryant & Second	1-hour	12.9	9.4	8.4	8.6
	8-hour	9.2	6.7	6.1	6.2
California & Montgomery	1-hour	12.3	8.7	7.6	7.8
	8-hour	8.6	6.3	5.6	5.6
First & Mission	1-hour	13.8	9.5	8.4	8.6
	8-hour	9.4	6.8	6.1	6.1
First & Harrison	1-hour	11.6	8.1	7.3	7.4
	8-hour	8.0	6.1	5.6	5.6
Howard & New Montgomery	1-hour	13.0	9.4	8.3	8.4
	8-hour	8.7	6.3	5.7	5.7
Market & Third	1-hour	13.1	9.1	8.0	8.1
	8-hour	9.5	6.9	6.3	6.7
Stockton & Sutter	1-hour	12.6	8.9	8.1	8.2
	8-hour	9.0	6.5	5.8	5.8

(Continued)

TABLE VII.I.2: EXISTING AND PROJECTED WORST-CASE CURBSIDE CARBON MONOXIDE CONCENTRATIONS, AT SELECTED INTERSECTIONS IN THE DOWNTOWN STUDY AREA, 1984, 1990, AND 2000 UNDER THE DOWNTOWN PLAN AND ALTERNATIVE 1 (parts per million) (a) (Continued)

(a) Alternative 1, No Project, would be the worst-case scenario; the Downtown Plan and Alternatives 4 and 5, which would be essentially the same, would be the best-case scenarios. Alternatives 2 and 3 would fall within this range.
(b) The tabulated concentrations are the sum of a background component, which is influenced by the cumulative effects of all vehicular traffic in the project vicinity, and a local component, which reflects the effects of vehicular traffic at the intersection of interest. Both components were calculated by the Modified Linear Rollback (MLR) method. A full description of MLR can be found in ABAG Air Quality Technical Memo 43, January 1983. Concentrations are in parts per million. Underlined values are in excess of the state or federal CO standards. The one-hour state standard is 20 ppm; the one-hour federal standard is 35 ppm; the eight-hour state and federal standard is 9 ppm.

SOURCE: Environmental Science Associates

Sulfur Dioxide Concentrations

Downtown Plan

SOx emissions associated with downtown development would increase under the Downtown Plan, because SOx emission rates would remain constant and traffic would increase. However, because of the small magnitude of the increase (about 0.1 ton per day), and because the ambient concentrations of SO_2 are currently low, it is unlikely that these emissions would bring San Francisco's concentrations significantly closer to violating the standard.

Alternatives

SOx emissions associated with downtown development would also increase with all of the Alternatives. However, because of the small magnitude of the increases (ranging from about 0.1 ton per day under the Downtown Plan and Alternatives 4 and 5 to about 0.2 tons per day under Alternative 1), and because the ambient concentrations of SO_2 are currently low, it is unlikely that these emissions would bring San Francisco's concentrations significantly closer to violating the standard.

J. NOISE

Traffic noise generated by projected development under the Alternatives would not be noticeably/1/ different from that generated by development under the Downtown Plan (see Table IV.J.2, p. IV.J.9). Noise measurement instruments would be able to show a measurable, although not noticeable difference, from noise levels projected under the Downtown Plan in a few locations. These are summarized in Table VII.J.1, below.

TABLE VII.J.1: STREETS ALONG WHICH 24-HOUR NOISE LEVELS (Ldn)(a) UNDER ANY OF THE ALTERNATIVES WOULD DIFFER FROM THOSE UNDER THE DOWNTOWN PLAN

Street	Subarea	Alternative(s)	Difference (in dBA)(b) in 24-Hour Noise Levels (Ldn)(a) From Those Under The Downtown Plan(c)
Mission St.	1	1	+1
Van Ness Ave.	4	1	-1
Tenth St.	4	3	+1
Stockton St.	6	1,2,3	-1
Stockton St.	7	1,2,3	-1

(a) Ldn: an averaged sound level measurement based on human reaction to cumulative noise exposure over a 24-hour period. To account for greater annoyance, 10 dBA are added to measured noise levels between 10:00 p.m. and 7:00 a.m.

(b) dBA: decibels on the "A"-weighted scale. The "A"-weighted scale simulates the frequency response of the human ear.

(c) See Table IV.J.2., p. IV.J.9.

SOURCE: Environmental Science Associates, Inc.; using U.S. Department of Transportation, 1978, Highway Traffic Noise Prediction Model, Report No. FHWA RD-77-108, calibrated from downtown San Francisco street noise; and traffic data from TJKM.

Intrusive noise levels from diesel bus traffic would also be similar among the Downtown Plan and the Alternatives. Alternatives 3, 4, 5 and the Downtown Plan would generate almost identical demands for new Muni ridership between 1990 and 2000 (see Section IV.E Transportation and Circulation). New diesel bus traffic noise, therefore, would likely be the same for Alternatives 3, 4 and 5 as that discussed in Section IV.J for the Downtown Plan. While Alternatives 3, 4, 5 and the Downtown Plan would all generate about a 12% increase in Muni ridership between 1990 and 2000, Alternative 2 would generate a 13% increase in that period, and Alternative 1 (No Project) would generate a 14% increase. If these demands are distributed throughout the Muni system in proportion to current Muni demands, and Muni expands its capacity to meet these demands, Alternatives 1 and 2 would result in about one more diesel bus trip in the year 2000 than would the Downtown Plan during the evening peak hour on the downtown streets carrying the heaviest diesel bus traffic (Mission and Market Sts.). Diesel bus traffic on all other streets would generally be the same as under the Downtown Plan (see Section IV.J). Differences in diesel bus noise among the Alternatives and the Downtown Plan would not be noticeable.

There would be discernable differences among the Downtown Plan and the Alternatives in the amount of construction noise generated from buildings under construction simultaneouesly. Table VII.J.2 compares the number of buildings which would be under construction simultaneously in the C-3 District for the Downtown Plan and the Alternatives.

TABLE VII.J.2: FORECAST AVERAGE NUMBERS OF BUILDINGS SIMULTANEOUSLY UNDER CONSTRUCTION IN THE C-3 DISTRICT UNDER THE DOWNTOWN PLAN AND ALTERNATIVES 1 THROUGH 5, 1990-2000

Average Number of Buildings Under Construction Simultaneously between 1990 and 2000 (a)

	Alternatives				
Downtown Plan	1	2	3	4	5
14	25	25	21	16	14

(a) Based on an assumed two-year construction period for each building.

SOURCE: Environmental Science Associates, Inc.

The Downtown Plan and the Alternatives would all introduce new uses into the C-3 District noise environment. This environment, with existing and projected street-level 24-hour noise levels (Ldn) of about 70 dBA (see Table IV.J.2), can be annoying.

Persons exposed to 70-dBA noise levels all day for many years would experience hearing damage. Neither the Downtown Plan nor any of the other five Alternatives would noticeably/1/ affect outdoor noise levels. The Downtown Plan and all of the Alternatives would add to the daytime population in the C-3 District, and thus would expose more people to these high noise levels while they were outdoors (travelling to and from work or to and from lunch, eating lunch or sitting outside, running errands, etc.). Although the Downtown Plan and the Alternatives would differ in the number of downtown employees exposed to the loud outdoor environment (Alternatives 1, 2, 3, Downtown Plan, 5 and 4, in decreasing order), the types of impacts would be the same as described for the Downtown Plan in Section IV.J.

Under all the alternatives, new hotel rooms and housing units would be required to be constructed in accordance with California State Noise Insulation Standards./2/ In addition, the City's Plan for Transportation Noise Control/3/ recommends the inclusion of noise insulation features in all new uses incompatible with their noise environments (see Figure IV.J.1 in Section IV.J. Environmental Setting and Impact). It is likely, therefore, that workers and residents in new C-3 District buildings constructed under any of the Alternatives would not be exposed to disruptive indoor noise levels (due to outdoor traffic noise). New uses which could be adversely affected by traffic noise would be outdoor areas not adequately shielded from the noise, such as open space associated with residential uses (balconies, courtyards), and uses where the perceived quality of the environment could be affected, such as required open space and ground-floor retail uses.

The number of new downtown residents would increase under the Downtown Plan and all of the Alternatives. Different Alternatives would encourage different numbers of dwelling units (Alternatives 4, 2, 5, 3, the Downtown Plan and 1, in decreasing order). The outdoor open space associated with these units (required by the City Planning Code) would be adversely affected located anywhere in the C-3 District, but particularly in Subareas 1, 2, 4, 6 and 7. Subareas 3 and 5 contain pockets of comparatively less noisy residential areas (see Section IV.J). Over 50% of Alternative 2's new C-3 District housing would occur in Subareas 3 and 5. Alternatives 5, 1 and 4 would all encourage the development of over 40% of their new housing in these comparatively less noisy areas. The Downtown Plan would encourage the construction of about 40% of its new housing there, and Alternative 3, less than 20%.

Subarea 1 would receive a substantial share/4/ of the new housing under the Downtown Plan and all of the Alternatives. Unless constructed at the top of new buildings, or otherwise shielded from traffic noise (see Section V.J. Mitigation), balconies associated with these units would be too noisy to be enjoyable.

NOTES - Noise

/1/ Differences in environmental noise levels of less than 3 dBA are not detectable to the human ear.

/2/ Title 25, Chapter 1, Subchapter 1, Article 4, of the California Administrative Code.

/3/ City and County of San Francisco, Department of City Planning, September 1974, Plan for Transportation Noise Control, Environmental Protection Element of the Comprehensive Plan, adopted by Resolution 7244 of the San Francisco City Planning Commission.

/4/ Subarea 1 would have more new housing than any other subarea under Alternatives 3, 4 and the Downtown Plan. Subarea 1 would have the second-most new housing (after Subarea 5) under Alternatives 1, 2 and 5.

K. SEISMIC SAFETY

Seismic hazards associated with additional developments downtown would increase primarily as a result of 1) increased concentrations of employee and residential populations; 2) increasing heights and concentrations of buildings, 3) increased development on geologically unstable areas and 4) preservation of potentially hazardous structures. On the basis of these factors, the ranking from potentially most seismically hazardous during the work day to potentially least hazardous is Alternative 1, 2, 3, Downtown Plan, 4 and 5. The Downtown Plan and the Alternatives are described below.

Downtown Plan

The Downtown Plan would have generally lower height limits than the other Alternatives. The Plan would add about 49,600 employees and about 1,100 residents to downtown between 1990 and 2000. This would be the third lowest total downtown population increase of any of the Alternatives (only Alternatives 4 and 5 would be lower). Development would be concentrated in Subareas 1 and 2. Additional development in these subareas would increase the number of workers who would be susceptible to large quantities of falling glass and debris (Subarea 1), limited emergency access (Subarea 1), and high liquefaction and subsidence potential (Subarea 2 and part of Subarea 1). Development in the seismically unstable Subarea 2 would be greater than in any other Alternative. Overall, the Plan would be safer seismically in the daytime than Alternatives 1, 2, and 3, and less safe than Alternatives 4, and 5. Because of the Plan's low projected increase in residents, during non-working days it would be safer than Alternatives 2 and 4, as safe as, or safer than, Alternatives 3 and 5, and less safe than Alternative 1.

Alternative 1

Alternative 1 would have generally higher height limits and about 14,500 additional people downtown in the year 2000, compared with the Downtown Plan. The bulk of this population would be added in Subarea 1, in areas of generally poor ground stability. This Alternative would result in the demolition of the greatest number of old buildings downtown, which could slightly reduce the potential for casualties from collapsing buildings. Employee density in Subarea 1 would reach about 1,050 employees per acre (epa) by 2000, compared with about 900 epa in 1990. Overall work-day employee density in the entire downtown under this Alternative would be about 550 epa, highest of any Alternative. This Alternative would result in the demolition of a greater number of pre-code structures than the Plan, reducing the hazard resulting from these buildings compared with the Plan. In addition, this Alternative proposes about 160,000 fewer sq. ft. of housing than does the Plan. However, should an earthquake occur during work or commute hours, the high overall density would result in severe street and sidewalk congestion in a major earthquake, blocking emergency vehicles and exposing the largest number of people to the greatest hazards of falling debris of any of the Alternatives.

Alternative 2

Alternative 2 would be similar to Alternative 1, but would have slightly lower height limits, about 5 percent fewer workers and about 40% more housing. This Alternative would have more than 10,000 more workers downtown than would the Downtown Plan, and more than 60% of its development in Subareas 1 and 2; areas of poor overall ground stability and already severe congestion. Average employee density would be about 545 epa compared to about 530 under the Plan. Housing (24-hour residents) density would also be about 35% higher than that under the Plan. This Alternative would pose the second most-severe seismic safety impacts during the work-day.

Alternative 3

Alternative 3 would add about 9,500 more new employees to downtown than would the Downtown Plan. However, the total number of new workers in Subareas 1 and 2 would be about 1,500 less than under the Downtown Plan. This Alternative would have about 37,900 residents in downtown compared with 37,500 under the Plan, and would bring more development to less congested and more geologically stable subareas (primarily Subareas 3 and 5). Street and sidewalk congestion in Subarea 2 would be less than with the Plan, while Subareas 4, 6, and 7 would be more congested with pedestrians and vehicular traffic, resulting in potentially greater hazards during the working day. This Alternative would have the lowest overall height limits in areas of high seismic shaking or liquefaction potential (portions of Subareas 1 and 2) and would not necessarily preserve potentially hazardous historic buildings. This would tend to reduce seismic hazards compared with the Plan. However, because of the considerably larger number of people to be located downtown, this Alternative would likely result in slightly more injuries than would the Plan.

Alternative 4

Alternative 4 would concentrate workers in Subarea 1 but would have comparatively few (3,630) new workers in the high hazard areas of Subarea 2. This Alternative would add over three million sq. ft. of housing to the downtown. Overall, this Alternative would result in about 4,300 fewer workers downtown than would the Downtown Plan, and 5,400 more 24-hour residents downtown. Alternative 4 would have the lowest overall population densities of any Alternative, about 520 epa. This Alternative would have generally slightly greater height limits than the Plan in the South of Market area, and generally similar height limits north of Market Street. This Alternative would pose greater seismic hazard in Subarea 1, (demolition of older structures would reduce this hazard some) but less hazard in Subarea 2 than would the Plan. Overall, the seismic hazards during the work-day resulting from full development under this Alternative probably would be slightly lower than full development under the Downtown Plan. At night, this Alternative would pose the highest seismic hazard of any of the Alternatives because of the larger number of 24-hour residents.

Alternative 5

Alternative 5 would be similar to Alternative 4, but would shift about 2,000 people from Subarea 1 to Subarea 2 and about 1,000 additional people from Subarea 1 to Subarea 5. Alternative 5 would have about 5,000 fewer residents than would Alternative 4 (about 800 more than under the Plan). Overall worker density would be almost the same as for Alternative 4, both with about 520 epa. Height limits in Subarea 2 would be greater than under Alternative 4 and the Plan. The slightly lower number of people in Subareas 1 and 2 projected under this Alternative would have similar effects on overall seismic safety, as would the Plan's lower height limits. In addition, preservation of older buildings under the Plan could result in slightly higher number of building collapses than under this Alternative (assuming that buildings are not brought up to Code when development rights are transferred). Therefore, downtown development under Alternative 5 would be slightly safer than that under the Downtown Plan, and would likely be the safest of all of the Alternatives in a major earthquake.

REASONS FOR SELECTING THE PREFERRED ALTERNATIVE

Each of the five Alternatives has some features in common with the Downtown Plan. The Plan, in the opinion of the Department of City Planning, contains the largest number and best combination of important and desirable features for guiding downtown growth.

A major impetus to studying controls for the C-3 District was the amount and location of growth in the downtown. Analysis in the Consultant's Report of a broad range of alternatives developed by a variety of groups showed a surprisingly small difference in projected office and total space growth and in employment growth. However, trends were different among the alternatives, and the Downtown Plan was developed based in part on the results of this analysis. Because it was felt that the quality of life in the Financial District (C-3-0) would suffer if development continued as under Alternatives 1, 2 or 3, the Plan limits growth of office space to a lesser amount than do these alternatives. Although the Plan would allow a larger overall increase in office space than Alternative 4, this growth is generally channeled to Subarea 2 (the area south of Market Street, north of Folsom and east of YBC), in order to retain the character of the Financial District, north of Market Street, while permitting continued employment growth.

In the long term, the shift of new development from the Financial District to south of Market east of YBC would become fully realized. The market would have time to adjust to provisions redirecting growth to this presently less desirable part of the C-3 District, and the area would become more successful in attracting a proportionally larger amount of development. The Downtown Plan would limit employment growth more than would Alternatives 1, 2, or 3, but would allow for slightly more employment in the C-3 District than Alternatives 4 or 5. The Plan would also restrict growth of office space in the Union Square retail area, Kearny Street, and the C-3 portion of Chinatown, unlike any other alternative, and would probably produce the smallest total new square footage in the C-3 District. However, the Plan by improving amenities and attractiveness of the C-3 District could over the long term attract growth that would not be occurring at that later time under other alternatives without those amenities.

The Plan was preferred because it recognizes the need to provide jobs and to continue San Francisco's role as an international center of commerce and services. The Plan would provide more new jobs to enhance these city functions, to expand employment opportunities and to provide new tax revenues, than would Alternative 4, thus making the Plan preferable to that Alternative. The desirability of this continued growth is threatened, however, by the adverse environmental effects it produces. Therefore, the provisions of the Plan which limit growth in the north of Market areas and channel new office space to the south of Market east of YBC, those provisions that add visual urban design and climate amenities, and those that somewhat limit the amount of employment and space growth, make the Plan more appropriate than Alternatives 1, 2 and 3. The preferred project was selected because it would make possible appropriate growth and at the same time manage its effects, preventing new building where change would diminish the City's character or liveability but accommodating development that would further the City's economic and social objectives.

Some of the key features which make the Plan preferable to the other alternatives are those relating to urban design, sunlight access, pedestrian amenities and historic and architectural preservation. The Plan includes design controls to lower height limits in certain areas of the C-3 District and to reduce building bulk and require setbacks to produce more sculptured building forms. These controls are not provided in Alternatives 1, 2, 3, or 4, all of which would probably result in bulkier, less interesting buildings. Alternative 3, in particular, with limited design controls and substantially lower height limits and floor area ratios, would produce generally flat, bulky buildings throughout the C-3 District.

The Plan includes detailed guidelines for protecting sunlight access to many publicly accessible plazas and to important pedestrian streets; only Alternative 5 includes similar guidelines or policies, though they are more limited than those in the Plan. Although Alternatives 2 and 3 include a general policy that suggests limiting shadow on public plazas, they do not provide the clear requirement that shadow be strictly limited in particular locations during particular times. Alternatives 1 and 4 do not address the issue. In a similar vein, the Downtown Plan and Alternative 5 require provision of open space, art, architectural embellishments, ground floor retail and other pedestrian amenities that are lacking in other alternatives.

The Plan contains a prohibition against demolition of architecturally and historically significant buildings which is not present in any other alternative. Selected groupings of buildings (Conservation Districts) would receive a degree of protection through both eligibility for TDR and requirements that new buildings be built to a scale comparable to others in the district. Alternative 5 includes the only other proposal to prohibit demolition of some significant buildings, but the prohibition would be tied to use of transferable development rights (TDR) rather than providing direct protection for those buildings. The analysis of the proposed TDR program in Alternative 5 (see Consultant's Report Section V.B., pages 51-57, and Consultant's Report Appendix G, pages G.10-25) provided the basis for revising the program in the Downtown Plan to one that provides a better balance between the number of sites likely to sell TDR and those likely to purchase.

Finally, many of the amenities that could be anticipated in Alternatives 1, 2, and 4 would occur only in return for floor area bonuses, rather than as requirements of development. This would both reduce the market for TDR purchase, limiting its effectiveness, and fail to ensure those amenities considered important by the Department of City Planning.

For all of these reasons, the Downtown Plan provides the most acceptable combination of features which the Department believes are necessary to minimize impacts of development in the downtown area.

NOTES - Alternatives

/1/ The full text of each Alternative is presented in Appendix B of the Downtown EIR Consultant's Report, published by Environmental Science Associates, Inc., in May 1983. Appendix B of the Consultant's Report is hereby incorporated by reference into this EIR. The Consultant's Report and its appendices are available for inspection at City libraries and the Department of City Planning, 450 McAllister Street, 5th Floor, San Francisco.

/2/ The fifth initiative, which would have limited new commercial office development in the City to 1.0 million sq. ft. per year, is treated herein as a mitigation measure (see Section V).

VIII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The Downtown Plan, in combination with other employment growth assumed for San Francisco and the region, would cause significant strain on transportation systems if they remained at their current capacities. The Downtown Plan includes mitigation measures that would substantially reduce transportation impacts. Adoption of the Plan would further the process of implementating these mitigation measures. Delay in adopting the Plan (thereby retaining Alternative 1 as land use controls) would also delay implementation of these measures to some future time while allowing more employment growth and therefore more impacts than would occur under the Plan.

Increased transportation trips from the additional development projected to occur in the C-3 District would lead to increased TSP emissions in San Francisco and would contribute to cumulative NOx emissions in the Bay Area, resulting in violations of TSP and NOx air quality standards with concomitant health effects, reduced visibility, and, in combination with other new development in the region, increased formation of acid rain and increases in ozone levels outside of the Bay Area. Adoption of the Plan is appropriate now because less TSP and NOx emissions would result than if development permitted under the present Planning Code (Alternative 1) were allowed to continue. Adoption of the Plan would not preclude further limitations on development in the future.

The increased development projected to occur under the Plan would result in demolition or substantial alteration of architectural/historic resources. The project is justified because it contains more stringent controls on demolition of architectural/historic resources than any other Alternative considered.

The proposed Plan would allow higher population densities than presently exist in an already dense area of San Francisco. Such high densities in a major earthquake would lead to increased fatalities from falling building materials, pedestrian massing in roadways, and obstructions delaying arrivals of medical teams. These higher densities would also ean more workers who may have to be accommodated within San Francisco, regardless their actual place of residence, for the three days after a major earthquake in which e transportation systems may be inoperable. The highest densities are projected to cur in Subareas 1 and 2, and are coupled with poor soil stability which accentuates ismic hazards. Approval of the project is justified because it would not allow population nsities downtown to be as great as is presently permitted under the Planning Code lternative 1). Restraining the density increase at this time does not preclude the option considering further alternatives in the future.

IX. SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

The Plan, in allowing continued development of the downtown, and particularly a shifting of development to Subarea 2, would generally commit future generations to continuing to allow more such uses. This commitment would be comparable to the present commitment to continue downtown development, based on the amount of development already existing in the downtown area.

Construction materials and energy used for the new development involve use of some non-renewable resources. Continued development would also result in continuing increases in automobile and transit trips to and from work. The additional trips, plus construction activities from new development, would subject the region to future air quality problems from increases in TSP and NOx emissions.

The proposed Plan would commit to allowing demolition or substantial alteration, and therefore irretrievable loss, of some architectural/historic resources. No other Alternative proposes controls that would reduce this impact. The additional development permitted under the Plan would be in an area of substantial seismic hazard, albeit a hazard less than that present under the Planning Code (Alternative 1).

X. GROWTH INDUCEMENT

The Downtown Plan would accommodate continued economic expansion in San Francisco's downtown area. Under the Plan, the C-3 District would maintain its role as the major financial and business center of the region, as an important local and regional retail center, as a major tourism and convention center, and as a growing entertainment center. It would have an expanded role in providing housing.

Whether economic growth in the C-3 District would represent a net addition for the City or the region depends on the locational options of business activities that could be in the C-3 District. In other words, it depends on where the activity would be if it were not in the C-3 District. To the extent that businesses could locate outside the region, accommodation of growth in downtown San Francisco would represent a net gain to the City and the region. On the other hand, if the businesses' location options were limited to the Bay Area, regardless of C-3 District policies, growth in the C-3 District would affect the distribution of employment in the region but not the regional total. Within the Bay Area, if the location options included San Francisco and other Bay Area counties, growth in the C-3 District would represent a net addition to the City. If the options were among only San Francisco locations, either in the C-3 District or outside the C-3 District, then growth in the C-3 District would affect the distribution of employment in the City but not the City total.

For the C-3 District, there would be businesses in each of these groups. However, most of the economic growth forecast for the C-3 District would not represent a net addition to total regional growth. From the perspective of San Francisco, however, C-3 District growth would primarily be a net gain in economic activity for the City.

MULTIPLIER EFFECTS OF C-3 DISTRICT ACTIVITY

Major office and tourist business of the types located in San Francisco's C-3 District support other economic activity through business purchases and the spending of employees and employee households. In economic terms, these inter-relationships are defined as multiplier effects. They include subsequent rounds of spending by businesses supported by the major office activities and the household spending of employees in these businesses. The multiplier effects of C-3 District activity occur throughout the City and the region. They occur within the C-3 District to the extent that businesses there make purchases from other C-3 District businesses and that employees spend some of their incomes near where they work.

The businesses and employees supported by these multiplier effects include a range of types of businesses and of types of jobs and labor. They include manufacturing, distribution, retail sales, service, and office functions. A large part of the economic network which serves downtown businesses is located in San Francisco.

Regional effects represent indirect growth-inducing impacts of the Downtown Plan to the extent that the economic activity generated by growth of C-3 District employment is new to the region and would not otherwise have occurred in the Bay Area.

THE RELATIONSHIP BETWEEN EMPLOYMENT GROWTH, POPULATION, AND HOUSING

C-3 District growth under the Downtown Plan would have some direct growth-inducing effect on population and housing in the City and the region, although the increase in population and housing would not be proportional to the increase in C-3 District employment. First, as described above, not all of the C-3 District growth would represent a net addition to San Francisco or to the region. Most of the employment growth forecast for the C-3 District would otherwise occur elsewhere in the Bay Area, so the associated population and housing effects cannot be solely attributable to C-3 District policies. Second, the increase in people employed in the C-3 District would not represent an equal increase in population in San Francisco or the region. Some of the increase would come from increased labor force participation from existing residents. Employment growth could also represent reductions in the number of unemployed people in the City or region.

Any net increase in City or regional population would have implications for the growth of households and housing. The increase in households depends on how both the existing and new population would settle into households, in terms of persons per household and workers per household. For some time into the future, the number of workers per household is expected to increase. Thus, the growth of households would be less than the growth of population, which, as described above, would be less than the growth of employment.

The growth of households would support the production of housing. How the housing and the households would be distributed throughout the region depends on a variety of demographic, lifestyle, and housing market factors.

CONCLUSIONS

- The Downtown Plan's accommodation of growth in the C-3 District would result in a relatively small net addition of employment in the region. Businesses that locate in the C-3 District that would otherwise have located in another headquarters city are examples of this type of growth-inducing impact. Other portions of this net addition would be indirect due to the multiplier effects of C-3 District growth. For example, businesses that serve the C-3 District would expand their operations and add more employees.

- The effects of the Plan on employment growth in San Francisco would be greater than the Plan's effects would be on regional employment. In other words, the Plan's effects would represent more of a net addition to the City than they would to the region. In terms of indirect, multiplier effects, many of the businesses that would expand to serve increased C-3 District activity are located in San Francisco.

- The net addition of population and housing in the region as a consequence of C-3 District employment growth under the Plan would depend on the extent to which the employment growth was a net addition to the region.

- There are a number of other factors, such as increased labor force participation and patterns of household formation, which imply that any net addition of population and housing would not be directly proportional to the net addition of employment. It is most likely that the addition of population and housing would be less than the addition of employment.

- Any net addition of employment, population, and housing in the City or region would have impacts on transportation systems, on community services, and in other areas of environmental concern.

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XIII. GLOSSARY OF TERMS, ACRONYMNS, AND ABBREVIATIONS

ABAG: Association of Bay Area Governments

Absorption: the occupancy of unoccupied building space by office, retail or other activity. In the case of hotels, absorption refers to attaining a certain year-round level of occupancy for new hotel rooms.

Active Faults: are those which have a historic record of activity or show other geophysical evidence of movement within approximately the last 10,000 years.

Alternative: as spelled with a capital "A" in this report, an Alternative is one of five proposals other than the Downtown Plan for managing growth in the Downtown area of San Francisco. The Alternatives are addressed in Section VII of this EIR.

Ambient Air Quality Standard: a pollutant-concentration limit for ambient air, established by state or federal government to protect the public health or welfare.

Approved: C-3 district development projects approved by the City Planning Commission as of August 25, 1983, but not yet under construction by that date. These projects are projected to be available for occupancy between 1984 and 1990.

Architectural Resource: a building rated, "A", "B", or "C" in the Heritage Survey, and/or "3", "4", or "5" in the Department of City Planning Survey.

BAAQMD: Bay Area Air Quality Management District, the local agency empowered to regulate air quality, and co-author of the 1982 Bay Area Air Quality Plan.

Baseline Forecasts: estimates of the change in C-3 District employment between 1981 and 2000, assuming long-term market conditions indicated by the development patterns established since the early 1960's. A baseline forecast was prepared for each business activity and for functions within office activities. The baseline forecast for each business activity and function established the long-term demand for space in the C-3 District, independently of the effects of revised downtown land use policies.

Bay Area Air Quality Plan (1982): a regional plan prepared by ABAG, BAAQMD, and MTC which analyzes air quality problems and recommends emission control strategies to attain the federal ambient air quality standards.

Bonus: an award of the right to increase the amount of development of a site in exchange for the provision of certain features, such as plazas, pedestrian arcades, etc.

Building Envelope: the spatial volume on a site within which a building may be built. The Building Envelope is determined by height and bulk limits, setback requirements, etc.

Business Activity: a term used herein to identify employment groups according to the types of space they occupy and functions they perform. The most common means of identifying employment groups is the Standard Industrial Classification (SIC) system. This system does not allow some of the distinctions that are important in analyzing a relatively small and specialized economic area such as the C-3 District. For example, it would not provide the distinction between the office and industrial employment of manufacturing firms.

Btu: British Thermal Unit

Calibration: the process of adjusting modal parameters to produce estimates that approximate measured or observed values.

Capacity: the maximum number of vehicles that can pass over a section of roadway or through an intersection during a given time period under prevailing roadway and traffic conditions. Also, the maximum number of passengers that can be transported over a given section of a transit line or group of lines in one direction during a given time period and prevailing traffic conditions.

CARB: California Air Resources Board, the state agency empowered to regulate air quality.

Cladding: exterior surfaces of buildings.

Central Business District (CBD): used in this report as defined by the Bureau of the Census, Census of Retail Trade. This is the downtown retail area of a Standard Metropolitan Statistical Area (SMSA) central city. The CBD is defined by existing census tract boundaries. For San Francisco it covers Census Tracts 115, 117, 121, 123, 124, 125, 176.01 and 176.02.

Clean Air Act (1970) and Amendments (1977): Federal law which, among other things, gave EPA authority to establish ambient air quality standards, and requires the states to identify areas within their borders that do not meet the standards and to devise a plan to attain the standards within specified time frames.

CO: carbon monoxide, a primary, non-reactive air pollutant that interferes with oxygen transport by the blood.

Code Gross Floor Area: total floor area of a building as defined under Floor Area, Gross, Section 102.8, San Francisco Planning Code, 1979 Edition, Part II, Chapter II of the San Francisco Municipal Code.

Cogeneration: the process of cascading energy from a fuel source such as natural gas through two or more extraction processes so as to obtain high quality energy, such as electricity, before obtaining low-quality energy such as process or space heating. Typically, this consists of adding a steam turbine to an existing natural gas-fired boiler to generate electricity before the steam is used for space or water heating.

Compound Growth Rate: same as compound interest used in financial calculations. Measures the percentage change in amount between two points in time, and expresses the change as a periodic rate in which the change at the end of each period is added to the immediately preceding base amount. It is not simply the percentage change between two points divided by the number of periods (usually years).

Constant Dollars: from a given year, future (or past) dollar amounts are expressed in terms of their value in the benchmark year's dollars. This measurement accounts for the effects of inflation so that dollar amounts in different years can be compared.

Conversion: in Land Use and Real Estate Development, conversion is a change in the use of an existing buildings, with or without major physical changes to the structure. Usually industrial, retail or residential space is converted to office space.

CBP: County Business Patterns (U.S. Department of Commerce Publication)

C-3 District: geographic area within the C-3 Use District boundaries as described in the Planning Code as of December 31, 1983.

Daylighting: the use of natural light in perimeter areas of building through windows, or in other portions of a building through skylights and light-wells, with a concurrent reduction in artificial lighting of those areas.

dBA: decibels on the "A"-weighted scale. The "A"-weighted scale simulates the frequency response of the human ear.

DCP: San Francisco Department of City Planning

Destination: the point or zone in which a trip ends (see Origin).

Down-zoning: reducing the allowable density or diversity of new development in an area through controls on building size and/or the uses permitted.

EDD: Employment Development Department (State of California)

Employment Density: an indicator of the relative number of employees in a given amount of space measured in terms of gross square footage of building space per employee.

EPA: Environmental Protection Agency, the federal agency empowered to regulate air quality.

FAR: Floor Area Ratio

HC: Hydrocarbons, a group of primary reactive air pollutants that contribute to the atmospheric formation of ozone (O_3) and suspended particulate.

FIRE: Finance, Insurance, and Real Estate

Floor Area Ratio (FAR): defined in the San Francisco City Planning Code, Section 102.10 as "the ratio of the gross floor area of all the buildings on a lot to the area of the lot."

Gross Square Footage: total floor area as measured by the exterior dimensions of the building or space within a building. Includes common areas (hallway, lobby, etc.), stairwells, mechanical facilities, or storage space not occupied by employees.

Intrusive Noise: any noise which stands out from background noise. Technically, intrusive noise is that noise level which is exceeded only 10% of the time during a given measurement period.

Inversion: an atmospheric condition in which warm air aloft limits upward dispersion of air pollutants contained in a colder layer of air near the surface.

Jitney: a five- to 21-passenger, privately-owned transit vehicle (larger than a taxi and smaller than a bus) that provides fixed-route service during peak periods.

Kwh: Kilowatt hour

Land Use: type of activity on a given parcel of land; e.g., office, residential, industrial, etc.

Ldn: an averaged sound level measurement based on human reaction to cumulative noise exposure over a 24-hour period. To account for greater annoyance, 10 dBA are added to measured noise levels between 10:00 p.m. and 7:00 a.m.

Lead: a primary, non-reactive air pollutant that interferes with the blood-forming, nervous, and kidney systems.

Level of Service: a measure of the effectiveness of a roadway or intersection in terms of operating conditions, usually associated with a specific volume-to-capacity ratio. (See Volume-to-Capacity ratio.)

Liquefaction: the transformation of granular material, such as loose, wet sand, into a fluid-like state similar to quicksand.

LIRAQ: Livermore Regional Air Quality model, a computer model that simulates the effects of meteorology, topography, and chemical interactions on Bay Area air quality. Ozone modeling for the Bay Area Air Quality Plan used LIRAQ.

Management / Technical Office and Trade / Customer Service Office: two types of office employment were defined for the employment analysis on the basis of differences in function. Management / Technical office activities include executive, administrative, and information processing functions of the following types of firms: manufacturing and mining, finance, insurance and real estate, business services, transportation, communications, and utilities, as well as government. Trade / Customer service office activities include the sales and customer service functions of wholesale and manufacturing businesses, retail services, and branch banks. These types of office activity have different characteristics, in terms of their use of space, their ability to pay for office space, and their preferences for types of space and locations.

MLR: modified linear rollback, a model used in conjunction with "hotspot" monitoring data for the 1982 Bay Area Air Quality Plan to project localized CO levels.

Modal Split: the proportion or percentage of total travel that uses each of various specified modes of transportation. (See Person-trips and Modes.)

Mode: a means or method of transportation such as automobile, transit, walking, and others. These categories can also be separated into subcategories such as Drive Alone, Carpool, Vanpool (for automobile), and specific transit usage (BART, Muni, etc.).

MTC: Metropolitan Transportation Commission, co-author of the 1982 Bay Area Air Quality Plan.

National Historic Landmark: see Appendix E, page E.3.

National Register of Historic Places: see Appendix E, page E.3.

National Register Property: a building or feature listed on the National Register of Historic Places.

Non-attainment Area: an area designated pursuant to the federal Clean Air Act Amendments that does not meet federal ambient air quality standards.

Non-attainment Plan: a local or regional plan, such as the Bay Area Air Quality Plan, for attaining the federal ambient air quality standards within specified time frames.

Non-work Travel: all trips excluding commute trips to and from work. (See Travel Purpose and Work Travel.)

NO_x and NO_2: Nitrogen oxides and nitrogen dioxide, respectively; primary and secondary reactive air pollutants that irritate the respiratory tract, reduce visibility, and contribute to the atmospheric formation of ozone (O_3), suspended particulate, and acid rain.

O_3: ozone, a secondary pollutant formed by atmospheric photochemical reactions involving hydrocarbons and nitrogen oxides, that impairs respiratory functions.

Office Space: building space occupied by office activities. This could be space originally built as office space or space converted from some other use such as retail or industrial.

Origin: the location of the beginning of a trip or the zone in which a trip begins.

Peak Hour: the hour during which the maximum amount of travel occurs; may be specified as the a.m. (or morning) peak hour or the p.m. (or afternoon or evening) peak hour.

Peak Period: the two-hour period within which the peak hour occurs.

Pedestrian Flow Regime: One of five categories of pedestrian density varying from Open Flow with no restrictions, to Unimpeded, then Impeded, then Constrained, then Congested, and finally Jammed with only shuffling movement.

Period (of earthquake): the frequency of vibrations in an earthquake. Different geologic materials have different periods; if these periods are similar to natural frequencies of building vibration, buildings can be severely damaged.

Person-Trip: a one-way movement of a person between two points for a specific purpose.

Person Trip-End (PTE): the origin or destination of a person trip. Each person trip has two ends. Two person trip-ends define one person-trip if the origin and destination are both in the study area.

Platooning: a flow phenomenon that occurs in traffic and pedestrian operations when groups of vehicles or pedestrians form closely bunched pulses. Platoons are usually caused by traffic signals where uniform flows are collected during red periods and released as single pulses at the start of the green period.

Pumped Storage: the practice of storing energy by pumping water into a reservoir using excess electric power available during low-demand periods. The stored water can then be cascaded through turbines during high power demands periods to generate electricity. Pumped storage facilities thus consume more electricity than they provide, but are effective in shifting excess electric capacity to peak demand periods.

Rent Areas: geographic areas (see Figure IV.B.1) defined specifically for the real estate analysis. The boundaries were drawn, after discussions with knowledgeable realtors and developers, to indicate general distinctions in the level of office rents among different locations in the C-3 District.

Reserve Margin: the amount of energy generation capacity in excess of peak demand that prevents a system overload.

Residence Patterns: descriptions of the distribution of C-3 District employees by their locations of residence (counties, commute corridors, San Francisco planning areas).

Richter Scale: measures magnitudes of earthquakes based on the amount of energy released. It is a logarithmic scale, with each full point increase representing 30 times as much energy released as the previous point (i.e., a magnitude 5 earthquake releases 30 times as much energy as a magnitude 4 earthquake). The Federal Emergency Management Agency has estimated that the 8.3 richter magnitude is the estimated largest magnitude earthquake that could be expected to strike the Bay Area at a reasonable level of probability, and that the main shock can be expected to be followed by large aftershocks over a period of weeks or longer. Each large aftershock would be capable of producing additional significant damage and hampering disaster assitance operations.

Ridership (Transit): the number of persons using a transit system or a portion of the system within a given time period.

Screenline: an imaginary line that divides a study area into parts and along which traffic or passenger counts can be conducted.

Shear: displacement or fracture along a plane.

Shear Zone: an area with evidence of displacement along a plane, usually evidenced by a linear zone of crushed rock.

SIC: Standard industrial classification

SIP: State Implementation Plan, a state plan incorporating local and regional non-attainment plans, for attaining the federal ambient air quality standards within specified time frames.

SO_x and SO_2: sulfur oxides and sulfur dioxide, respectively; primary and secondary reactive air pollutants that impair respiratory functions and contribute to the atmospheric formation of suspended particulate and acid rain.

Space in Office Buildings: all space within an office structure. This could include space occupied by retail stores, restaurants and branch banks. In an office building with a mix of uses, the office space is less than the total space in the office building.

SPUR: San Francisco Planning and Urban Research Association

Standard Industrial Classification (SIC): developed by the Office of Management and Budget, the Standard Industrial Classification system identifies establishments and other types of units (central administrative offices, auxiliary units) by the types of economic activity in which they are engaged. There are ten major divisions to the classification system, and these are further subdivided based on the principal products distributed or services rendered. The SIC system is a standard format used by both business and government in collecting and reporting data on economic activity.

Subarea: any of seven study areas of the Downtown Commercial (C-3) district, as shown in Figure II.I, p. II.5. The boundaries of the subareas correspond to the boundaries of the five C-3 use districts, or subdivisions of the use districts, identified in the Planning Code as of December 31, 1983. The boundaries of the subareas do not necessarily correspond to the boundaries of use districts proposed in the Downtown Plan.

Subsidence: subsidence is a lowering of the ground surface from settlement of fill or alluvium. This can occur from groundshaking, withdrawal of groundwater, or other causes.

TCU: Transportation, Communications, and Utilities

Transfer of Development Rights: the transfer from one lot to another lot of the difference between the actual square footage of a building to be retained on the first lot and the square footage of a new building that could be built on that lot as determined by the applicable floor area ratio (FAR). These "unused" square feet are referred to as Transferable Development Rights (TDRs).

TDR: Transferable Development Right

Travel Demand Analysis: study to determine the number of trips that would be expected to travel to and from a certain location given a specified land use. The study generally includes determining the modal split, routes expected to be used, and the total travel (vehicular, pedestrian, or transit) that would be expected on each route. (See Trip Generation, Trip Assignment, Trip Distribution.)

Travel Purpose: specific categories of trips, generally divided into work or other (shopping, school, recreational, etc.).

Trip Assignments: a process by which trips described by mode, purpose, origin, destination, and time of day are allocated among the available paths or routes.

Trip Distribution: the process of estimating movement or the total number of trips or percentage of trips expected to travel between zones, areas or specific locations.

Trip Generation: the determination of the number of trips that have an origin or destination at a specified location or area.

Trip Purpose: (See Travel Purpose.)

Trip-Linkage: the interrelationship of trips on one mode to trips on a secondary mode. For example, the pedestrian trip of a person walking to BART would be considered a linked trip because the BART trip has been considered the primary trip to or from the C-3 District.

Trip Rate: the number of trips or trip-ends expected to be generated by a specified land use, per employee or other given measure such as square feet, acre, etc.

TSP: total suspended particulates, primary and secondary pollutants that impair respiratory functions and reduce visibility.

Under Construction: C-3 District development projects under construction as of mid-1982. These projects are assumed to be completed and occupied in or before 1984 and are incorporated in the 1984 land use and real estate development setting.

Upgrading: investment in existing space. Possible consequences are changes of tenants, types of merchandising, the physical appearance of the space, rents, and the number of workers employed in a given amount of space. Changes occur without net additions of space or changes in use.

Vehicle Occupancy: the number of persons in a vehicle, including the driver.

Vehicle Trip-Ends (VTE): The origin or destination of a vehicle trip. Each vehicle trip has two ends. In a large study area, two vehicle-trip ends define one vehicle-trip if the origin and destination are both in the study area.

Visitor Activity: refers to the spending for lodging, food, retail goods and services, and transportation attributable to tourists and day visitors in San Francisco, who have travelled from outside the Bay Area region.

Volume-to-Capacity Ratio: the total volume on a roadway, or through an intersection, divided by the capacity. This ratio gives an indication of the operating conditions along a roadway or at an intersection. (See Level of Service.)

Work Travel: commute trips to and from work. (See Non-work Travel and Travel Purpose.)

Yerba Buena Center Projects: C-3 District development projects described in the approved Yerba Buena Center Redevelopment Area Plan, Second Supplement. These projects are assumed to be built and occupied between 1984 and 1990. Details of these projects are listed at the end of the C-3 District Land Use Inventory on file at the Department of City Planning, 450 McAllister Street, 5th Floor.

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